UNIVERSITY OF LIVERPOOL

The Geography of the Anglo-Jewish Population in the Twenty First Century: Characteristics, Spatial Distribution, Comparisons, and Trends

Thesis submitted in accordance with the requirements of the University of Liverpool for the degree of Doctor in Philosophy

by

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Acknowledgments

Just over four year have now passed since I first emailed Dr Hill Kulu. With thoughts of planning for my retirement from a career in transport planning and traffic engineering, and looking for something to keep my brain active, I was enquiring about the possibility of carrying out some research in an area that would have something to do with maps and population data – areas in which I have had an interest since childhood. To my surprise, rather than being sent away with a flea in my ear, I was invited to have a chat with Hill and his colleague Dr Paul Williamson. Apparently my first degree in civil engineering, also from the University of Liverpool, achieved some forty years previously, together with my master's degree, would be sufficient to address any qualification hurdle – that my last formal involvement with geography had been at the age of 13 would not be an issue. All that remained was for me to develop a suitable research proposal and bite the bullet!

Several months passed, in which time various possible research topics were developed and advice sought from other academics. Retirement from work happened in April 2013, and the PhD adventure started on 1 November of that year.

I did, of course, need to equip myself with some technical skills in the area of population geography and demography, so during my first eighteen months I took advantage of the population studies master's course provided in the department. I attended virtually the full set of modules needed to complete that course; so my thanks are due to the module coordinators and deliverers.

Time has flown by and just over three years after starting I'm typing an acknowledgements section, having just collated a first draft of an entire thesis. Clearly this would not have been possible without the help and involvement of a number of special people.

Foremost is my principal supervisor, Dr Paul Williamson. Paul has remained enthusiastic and encouraging throughout the whole process, particularly guiding me away from an obsession with playing with the data and writing things up at huge length, to thinking more about the how and why of what the analysis shows and what the wider implications of the findings might be (and to write a little more concisely!).

My other supervisors have played their part too – Dr Gemma Catney, primarily with advice on spatial distribution/segregation and minority groups, and Professor Hill Kulu on how I might make use of the ONS Longitudinal Study. I must also thank other staff and students of the Geography and Planning Department and School of Environmental Sciences, particularly those based on the first floor of the Roxby Building for their encouragement and camaraderie. I am grateful to Professors John Stillwell and Chris Lloyd for agreeing to be my examiners.

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Insofar as the papers that are included in five of the chapters of this thesis are concerned, I am most grateful to the editorial staff of the relevant journals, and the many anonymous reviewers of the papers, for their time and very helpful suggestions provided during the review process.

The most important person to thank, of course, is my darling wife Diane, whose own pursuit of a PhD, which she completed in 2012, no doubt had some influence on my decision to return to university. She has been my greatest supporter and (insofar as my writing style is concerned) probably my harshest critic! Without her love, advice, and support (and indeed that of the rest of our family) it would just not have been possible to undertake the challenge.

Philip Sapiro, December 2016

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List of Abbreviations

-2LL	minus 2 log likelihood
AIC	Akaike information criterion
BIC	Schwarz Bayesian information criterion
BoD	Board of Deputies of British Jews
CeLSIUS	Centre for Longitudinal Study Information & User Support
D	Index of Dissimilarity
E&W	England and Wales
HRP	household reference person
JPR	Institute for Jewish Policy Research
LA	local authority
LFS	Labour Force Survey
LS	Longitudinal Study
LSOA	lower layer super output area
MSOA	middle layer super output area
NHSCR	National Health Service Central Register
NJCS	National Jewish Community Survey
NS-SeC	National Statistics Socio-Economic Classification
OA	output area
ONS	Office for National Statistics
SAR	Sample of Anonymised Records
SIC	standard industrial classification
SMS	Special Migration Statistics
SOM	self-organising map algorithm

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Philip Sapiro

Abstract

This thesis presents an investigation into the population geography of Jewish residents of England and Wales in the twenty-first century. The aims of the study are to understand the spatial distribution of the group; identify whether there are distinct differences between groupings in different parts of the country; identify whether the demographics and nature of these groups is changing over time; and to examine whether the pattern for Jews is similar to those for other minority groups of comparable size. Most importantly, the thesis theorises what the patterns found may mean for the demographic future of Anglo-Jewry.

The results provide a clearer foundation for organisations responsible for the social welfare of Jewish groups in various parts of the country. In addition, as Jews have been present in Britain in significant numbers for longer than other minority groups, it provides useful insights into future trajectories for more-recently arrived groups. Thus, the findings provide an improved basis for policy formulation by the public authorities with wider responsibilities for combating disadvantage and improving social cohesion.

Building on an understanding of the history of Jewish settlement in Britain, and existing demographic studies, the analysis presented takes advantage of the inclusion of a question on religion in the 2001 and 2011 censuses. The principal data sources are census outputs, including Special Migration Statistics, individual microdata, and the Longitudinal Study. The analysis investigates the heterogeneity of the group through the development of a novel geodemographic classification methodology that addresses weaknesses in other approaches and the particular needs of small, unevenly distributed sub-populations. It finds evidence of seven distinct classes, with a strong spatial clustering to their distribution. The spatial distribution of Anglo-Jewry is examined in the context of other minority groups, including previously under-studied Arabs and Sikhs; that analysis finds a strong commonality to the pattern for Jews and some other small groups – their trajectories demonstrating a tension between the benefits of group congregation (apparently driven by religion, even in sub-populations defined by ethnic group) and a desire for suburbanisation. It also identifies the strong impact of geographic scale when drawing conclusions based on distribution indices. The underlying drivers of internal migration, an important contributor to changes in spatial distribution, are examined using logistic regression, having first legitimated the use of (post-move) census-derived characteristics in migration analysis. The assessment finds a broad consistency in underlying determinants of migration and, for the Jewish group, an absence of a group penalty inhibiting the propensity to move home, present for other small groups. The patterns of recent internal migration are analysed using spatial interaction modelling and multi-nominal logistic regression; longer term (1971 onwards) patterns are also examined.

Based on these analyses, and allowing for potential future patterns of births and longevity, population trends found through an innovative application of the 2011-based geodemographic analysis to 2001 census data are extrapolated to produce estimates of the Jewish population of England and Wales for future decades. The novel approach used takes account of group heterogeneity and absence of group-specific fertility and mortality data. The projection demonstrates an increasing Jewish population, in contrast to the reduction seen during the second half of the twentieth century, but with a growing proportion being found in strictly orthodox enclaves, which gives rise to a number of societal and policy implications.

Census and other Crown Copyright material

The work reported in this thesis makes extensive use of outputs from the England and Wales censuses of 2001 and 2011 (and some limited use of 1971, 1981, and 1991 outputs).

All census data and mapping used in the papers which are incorporated into Chapters 5 to 9 and the thesis as a whole are Crown Copyright and reproduced or adapted from data from the Office for National Statistics (ONS) licensed under the Open Government Licence v.2.0. 2011 census tables can be accessed via http://www.nomisweb.co.uk/census/2011/data_finder; 2001 tables can be accessed via http://www.nomisweb.co.uk/home/census2001.asp; and underlying ONS mapping via https://geoportal.statistics.gov.uk/geoportal/catalog/main/home.page. 2011 census commissioned tables were downloaded from https://www.ons.gov.uk/search?q=census+commissioned+tables&sortBy=title&filter=user_requested_data&q=census+commissioned+tables&size=10. The 2011 safe-guarded microdata and Special Migration Statistics files, and information from the Labour Force Survey, were made available via the UK Data Service and accessed under the terms of its End User Licence. Land Registry house price index, ONS Regional Household Income, and ONS Regional Labour Market data (used in Chapter 7) are also all Crown Copyright.

The ONS Longitudinal Study (LS) outputs presented in Chapter 8 and Appendix C, developed for this thesis as LS Project 0301777, have been cleared for publication by ONS via a final outputs clearance (foc) form dated 2 December 2016.

The permission of the Office for National Statistics to use the Longitudinal Study is gratefully acknowledged, as is the help provided by staff of the Centre for Longitudinal Study Information & User Support (CeLSIUS). CeLSIUS is supported by the ESRC Census of Population Programme under project ES/K000365/1. I alone am responsible for the interpretation of the data.

This work contains statistical data from ONS which is Crown Copyright. The use of the ONS statistical data in this work does not imply the endorsement of the ONS in relation to the interpretation or analysis of the statistical data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

The Geography of the Anglo-Jewish Population in the Twenty First Century: Characteristics, Spatial Distribution, Comparisons, and Trends

1. Introduction

1.1 The topic

Analysis of the results of the 2011 England and Wales census shows that: 8% of the population identified with a named non-Christian religion; 11% were born beyond the UK and western Europe; and 17% assigned themselves to an ethnic group other than white British/western European (source: author calculations from 2011 census tables KS209EW, QS203EW, and QS211EW). However, up until the Second World War, the only non-western European, non-Christian minority group of any size to be found in Britain were Jews (Ballard, 1996; Hannemann and Kulu, 2015). Whilst Jews had been present in Britain for several centuries, the major influx occurred between 1881 and 1914 (Endelman, 2002; Ballard, 1996), and their numbers reached a peak figure in excess of 400,000 in 1950 (Neustatter, 1955; Schmool and Cohen, 1998).

In contrast, the other principal groups that today form the majority of the non-Christian or non-white population of England and Wales had a much smaller presence prior to 1950, with the main periods of immigration occurring between 1955 and 1964 for black Caribbeans, 1965 and 1974 for Indians and Pakistanis, and during the early 1980s for people of Bangladeshi origin (Peach, 1996a). However, what the Jewish and more recent arrivals have in common is that 'each successive group of labour migrants faced a considerable degree of xenophobic hostility, to which they responded by (amongst other things) closing ranks in ethnic solidarity' (Ballard, 1996, p9). One of the consequences of this situation is the impact it has on the residential spatial distribution of the groups and its trajectory over time.

The aim of my research has been to carry out an investigation into the geography of the Jewish population of England and Wales in the early 21st century, to:

- understand the spatial distribution of the group;
- identify whether there are distinct differences between groupings in different parts of the country;

- identify whether the demographics and nature of these groups are changing over time;
- examine whether the pattern for Jews is similar to those for other minority groups of comparable size; and, most importantly
- theorise what these patterns may mean for the future.

The benefits in carrying out this research are three-fold. Firstly, as Jews have been present in Britain in significant numbers for two or three generations longer than other ethnic-group or religion-based minorities, an examination of their recent population geography should provide useful insights into future trajectories for more-recently arrived groups. Secondly, the analysis undertaken provides a clearer foundation for organisations responsible for the social welfare of Jewish groups in various parts of the country. And finally, the findings provide an improved basis for policy formulation by the public authorities with wider responsibilities for combating disadvantage and improving social cohesion in areas where minority groups are found.

1.2 Thesis structure and overview of chapters

Such is the importance and centrality of the 2001 and 2011 England and Wales religion (and particularly Jewish-related) census outputs to the thesis, that Chapter 2 focuses solely on this key data source. That chapter discusses the background to the inclusion of the census question on religion, what has been measured, issues of interpretation of and potential weaknesses in the data, and setting out the definition, for the purposes of this research, of who is a Jew (or a member of another religion or ethnic-group based sub-population). It describes how the 2001 and 2011 census outputs provide the information foundation that now allows more detailed examination of Jewish and other sub-populations to be undertaken than was previously possible.

Chapter 3 provides the background context for the study. An important pre-requisite to fully understanding the population geography of Jews in Britain is some knowledge of the history and development of the Jewish presence in Britain; this is examined in the first part of that chapter. The following part of the chapter complements the history by focusing on pre-census demographic studies of Anglo-Jewry, and this is followed by a section that provides a brief introduction to other

groups with whom the Jewish population is compared in some of the technical chapters that follow.

Chapters 5 to 9 describe how all the data and context have been applied to addressing the main aims of the research, as set out in the five bullet points at the start of this introduction. The core of each of these technical chapters is a sole-authored paper, four of which have already been published in specialist journals in the field; this thesis is thus submitted in accordance with the university's rules for thesis submission by published papers. The link text preceding each chapter sets the context, identifies the publication status of the paper, and notes any material differences between the text in the chapter and the original paper, such as the inclusion of supplementary material. Each paper provides a synopsis of background theory and previous studies relevant to the techniques and areas that it covers; however, the strictures of a journal article mean that the background information provided is brief and narrowly focused. In order to address this, Chapter 4 includes sections that provide a broader overview of matters that are relevant to the whole thesis – minority group spatial distribution theory and measurement, migration theory with an emphasis on internal migration, and cluster analysis that underpins geodemographic assessment.

Chapter 5 seeks to address primarily the third, but also the first point of the research aim; that is, to identify whether there are distinct differences between the groupings of Jews in different parts of the country (or whether they can be considered as a homogenous group) and to begin to understand the spatial distribution of the group.

Though previous studies have identified concentrations of strictly orthodox Jews (Vulkan and Graham, 2008; Graham, 2013a) and discussed their specific socio-economic characteristics (Holman and Holman, 2002; Valins, 2003), most studies have implied that 'mainstream' Jews can be considered as a homogenous group. Chapter 5 examines whether this is a realistic assumption, or whether the characteristics of Jewish groups vary across England and Wales. It uses geodemographic assessment (Everitt et al, 2011) as its technique to achieve this. That methodology allows large amounts of information to be condensed down, identifying groups of individuals or areas that share broadly similar characteristics. Unlike most geodemographic assessments, which use a consistent geographic unit of

analysis across the whole of the study area, the small size and rather uneven distribution of Jews in England and Wales required the development of a hybrid system, and excluded large areas of England and Wales where few Jews are found. It is in this context that the chapter contributes to the examination of the spatial distribution of Anglo-Jewry.

The following chapter (Chapter 6) focuses more closely on the first research bullet point (spatial distribution), building on the analysis of the previous chapter. More particularly it addresses the fourth bullet point of the research aim; that is, to examine whether the type of spatial distribution pattern for Jews is similar to those for other minority cultural groups of comparable size; and to consider to what extent the Jewish experience acts as a template for more recently arrived immigrant groups. It also examines changes over time – the subject of the third research point.

Whilst an examination of a small sub-population in isolation provides some useful and interesting perspectives on that group, unless some comparison is made with other groups (or the population as a whole, or a dominant 'benchmark' group), then important context to the research would be missing. Moreover, it would be unclear whether a particular finding was unique to the group under investigation, or merely reflected wider societal trends or a pattern found in other (small) groups. Thus, whilst Chapter 5 focuses solely on the Jewish group, Chapter 6 takes an even-handed approach, examining the spatial distribution of four equally small groups. It focuses on the 2001 and 2011 censuses, and examines changes in spatial distribution in that intercensal period for the four religion or ethnic-group based sub-populations that each contributed around 0.5% of the England and Wales 2001 population – Bangladeshis, Chinese, Jews and Sikhs. Spatial distribution is examined in the context of traditional spatial distribution theory (Massey, 1985). The chapter also examines the question of geographic scale and its impact on conclusions drawn from the use of indices of distribution (Massey and Denton, 1988). The most important issue addressed is whether heterogeneity amongst groups necessitates a more detailed examination of individual and household characteristics if patterns of spatial distribution are to be understood.

The focus of Chapter 7 is one of the principal mechanisms of change in spatial distribution examined in the previous chapter – internal migration. It thus contributes to understanding the first research bullet point – spatial distribution. It

seeks to provide an improved understanding of the 'why' of internal migration – establishing the underlying determinants of migration by examining data from the 2011 census, which covers moves made between 2010 and 2011.

As with the previous chapter, context is provided through consideration of four similar sized groups, and also the white British dominant group. For this time period, the four groups examined (each contributing about 0.5% of the 2011 population) are Arabs, Chinese, Jews, and Sikhs. Logistic regression is used to explore whether the impact of socio-demographic characteristics varies between groups, and to what extent a cultural penalty constrains the propensity to migrate for any of these groups, once these attributes have been taken into account.

The focus on internal migration continues in Chapter 8, and the same four groups are examined in parallel. It again focuses on the first and fourth bullet points – spatial distribution change and similarities/differences between groups.

This time, the specific geographic patterns are addressed, rather than the underlying determinants. The analytical work is intended to determine whether various patterns seen for the population as a whole are also evident for small cultural groups; examine what characteristics lead to selection of a particular region of destination for internal migration; and explore whether various groups respond differently to the impact of distance when inter-community moves are taking place. The white British group again acts as a benchmark group. This chapter develops both spatial interaction models (Fotheringham and O'Kelly, 1989) and multinomial logistic regression models to understand, rather than simply describe, geographic patterns found. In addition, analysis is carried out to see whether certain migratory patterns, such as counter-urbanisation (Champion and Atkins, 1996), can also be found in these small groups.

The main focus of the chapter is again change between 2010 and 2011. However, the Office for National Statistics (ONS) Longitudinal Study (LS) data are used in this chapter to extend the analysis of geographic migration patterns (and thus changes in spatial distribution) to consider changes over the 2001-11 period and also stretching back a generation to 1971 – providing further insight into the third research point (change over time).

Having examined spatial distribution and internal migration in a range of sub-groups in the previous three chapters, Chapter 9 returns the focus to just the Jewish

group. It addresses the final research bullet point – what these patterns mean for the future (and also the third point: change over time). It asks whether we can develop a technique to make projections of the future size and shape of the Jewish population of England and Wales, by building on what has been learnt from the 2011 geodemographic assessment and an understanding of spatial distribution and migration patterns.

It addresses the challenge by taking the novel approach of retro-fitting the geodemographic classification developed in Chapter 5 to data from the 2001 census, and using changes between the two census years to establish demographic trends by geodemographic class. Following a discussion on fertility and mortality trends, population projections for 2021 and 2031 by geodemographic class are developed to produce an overall picture of the population future of Anglo-Jewry.

Following on from the five substantive technical chapters, the final chapter pulls together the findings of the research work, discusses the conclusions reached, and considers whether the aims of the research have been met. It looks at how the area of research might be further developed and examines its wider implications and benefits.

1.3 Existing analyses of Anglo-Jewry using the 2001 and 2011 censuses

This thesis is not the first project to make use of the information on Anglo-Jewry included in the 2001 and 2011 censuses. Earlier works exploring these sources are summarised here. A comprehensive report on analysis of the 2001 census was produced by the Institute for Jewish Policy Research (JPR)[1] in 2007 (Graham, Schmool, and Waterman, 2007). The report presents an analysis of data extracted from both standard published census output tables, and also a large series of specially commissioned tables that delve more deeply into a number of areas. The tables presented illustrate the Jewish population in various local authorities, and the proportion of the population indicating the Jewish religion in those authorities. Mapping of Jewish density at ward and output area level is also included. Some

[1] JPR is an independent institute, based in London, that specialises in researching the state of the contemporary Jewish communities in the UK and elsewhere in Europe. JPR collects and analyses data to ensure that Jewish community organisations have the statistics and information they need.

information on migration (from commissioned tables) is also presented – though this does not differentiate between student moves and 'permanent' individual and household relocations. Age and gender structures are considered both nationally and for a selection of local authorities; numbers and locations of dependent children are also included. Household composition is comprehensively reported, making use of commissioned output to discuss the religion of married and cohabiting partners of Jews. Country of birth is also considered, and data provided for those born in Israel, South Africa and the USA – the three largest contributors of non-UK-born Jews. Indicators of affluence derived from the census – room overcrowding, housing tenure, and car ownership – are discussed, together with health indicators. Other sections of the report deal with educational achievement, economic activity and employment.

One use of the output from the 2001 census returns to the theme of earlier work (see Chapter 3) – use of burial data collected by the Board of Deputies of British Jews (BoD)[2]. Rather than the traditional use of these data to estimate population, Staetsky (2011) uses them in conjunction with census population data to produce Jewish death rates by age band and gender. The issue of compatibility between the numerator (deaths) and denominator (population) of the mortality calculations is dealt with extensively, and a range of rates is produced based on various combinations of adjustments to both death and population figures. The analysis indicates not only lower mortality rates for Jews compared with the wider England and Wales population (both genders and all ages), but also generally lower rates when compared with higher socio-economic groups in England and Wales.

Four papers were produced by JPR, in 2012 and 2013, following release of information from the 2011 census. The first (Graham, Boyd, and Vulkan, 2012), produced within days of the first data on religion to be published (local authority populations), provides a basic overview of the national picture, comparing the Jewish total for 2011 with 2001, and with other religion groups. In February 2013, following the release of data for electoral wards, a second paper was published

[2] The BoD was founded in 1760 and is the representative body of the Anglo-Jewish community.

(Graham, 2013b). This identifies the wards with the largest Jewish population, and also wards with the greatest positive and negative changes since the 2001 census.

The third paper (Graham, 2013a) focuses on age distribution, comparing Jewish and other religion groups' average ages, and producing population pyramids for the Jewish population as a whole. The paper draws attention to the major difference in age structure between haredi (strictly orthodox) communities (as represented by summing the data for the Boroughs of Hackney, Haringey, Salford, and Gateshead) and the remainder of the Anglo-Jewish community. For the fourth paper, Graham (2013c) returned to looking at local authority data with a more detailed examination of changes between 2001 and 2011, identifying those areas that have grown and those that have reduced in the size of their Jewish populations. The paper also includes a detailed section on the results of the census in Scotland which had recently been released by General Register Office for Scotland. All of these papers are essentially descriptive in their approach.

1.4 Novel aspects of the current thesis

It would be wrong to think of this thesis as simply adding to a body of work that has already been published in relation to the Anglo-Jewish population as reported in the 2001 and 2011 censuses, as it considerably pushes back the boundaries of work in this field in a number of important areas. Firstly, unlike previous work that concentrates on either a national picture or simply differentiates between known strictly orthodox enclaves and 'mainstream' Jewry, it deliberately sets out to examine the characteristics of the Jewish population to establish the degree of heterogeneity within the group. It examines spatial distribution (and its trajectory) in a more thorough manner and, for the first time, it gives attention to both the determinants and geographic patterns of internal migration for this group. More particularly, it gives consideration to issues of fertility and mortality, in combination with heterogeneity and spatial distribution, to produce population forecasts.

Importantly, a much more sophisticated approach to these subjects is applied, making use of techniques such as geodemographic assessment, logistic regression, and spatial interaction modelling. This represents the first occasion where such techniques have been applied to the study of Anglo-Jewry and, as set out in the technical chapters, a number of innovative elements have been incorporated into the methodology used. Indeed, the thesis also applies some of these techniques to the

analysis of the Sikh and Arab populations of England and Wales for the first time. Whilst a number of other researchers have compared a number of ethnic-group based populations side by side, the work described in this thesis extends the approach to consider a second aspect of cultural identity (Aspinall, 2000a; James, 2015), by comparing two religion-based groups alongside similar sized ethnic groups.

The new contribution that this thesis makes to population geography and demography is elaborated upon in each of the technical chapters and receives specific attention in Chapter 10. Prior to that, background matters and the technical content of the thesis are addressed, commencing with consideration of the development and utility of the question on religion included in the most recent England and Wales censuses.

2. The national census, religion, and principal study sources of data

2.1 Introduction

Most research projects start off with an idea or problem that needs to be addressed, and move towards some specific research questions. The investigation of the issues surrounding those questions normally requires information and data to allow analysis to be carried out and research to proceed (Robson, 2002). Careful exploration of information sources then identifies the presence of, assesses the quality of, and determines the utility of those sources, and then identifies a range of information and data that will need to be collected to address the research questions. In the case of this project, the sequence has been a little different. In 2001, the Office for National Statistics (ONS) included a question on religious affiliation in the England and Wales census (ONS, 2001) – see Figure 2.1. This had been the first time (apart from an investigation into church attendance as part of the 1851 census) that any information on individuals' religion had been collected in a Great Britain census. An effectively identical question (Figure 2.2) was repeated in the 2011 census (ONS, 2011a) producing, for the first, time, the opportunity to investigate, using a nationwide database, change over time in affiliation to religion, and trends in numerous differences in individual and household characteristics between and within religions. In many ways, therefore, it was the coming into existence of these major datasets that gave rise to the possibility of carrying out effective research in this area.

The general topic of the demography of Anglo-Jewry has been active for over a century, but hampered by a lack of comprehensive data. The presence of national census results now provides an environment in which it becomes possible to develop in-depth research questions that can realistically be taken forward. It was thus in this context that the aim of my research to carry out an assessment of the geography of the Jewish population of England and Wales in the early 21st century was developed.

2.2 The religion question in the 2001 and 2011 censuses

As the fundamental data source for this study is output based on responses to the question on religion, it is important to understand the background to the inclusion of the question and to consider any weaknesses that may be present in the data, and indeed to reflect on the purposes for which the data were originally collected

Figure 2.1 The religion question on the 2001 E&W census form

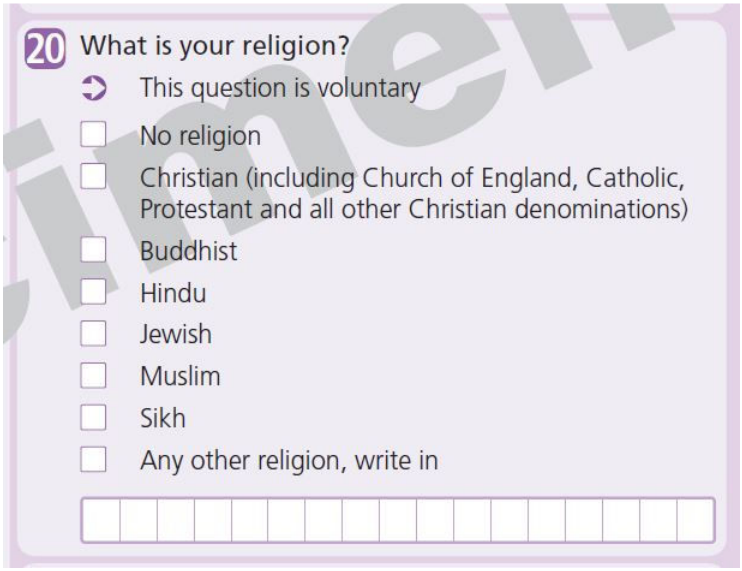

Figure 2.2 The religion question on the 2011 E&W census form

(government policy and financial planning) and the extent to which this impacts on their use in studies (Stewart and Kamins, 1993).

A number of papers set out the background and process through which a question on religion was ultimately included in the 2001 census in Great Britain (and subsequently repeated in 2011).

Southworth provides a detailed account of the mechanics and processes involved in its inclusion in England and Wales. She notes that

> the discussion over whether or not to include a question on religion was unusual in that it involved the formal setting-up of a religious subgroup consisting of representatives of the various religious communities along with key academics. This was the first case of such direct consultation with the public.
>
> (Southworth, 2005, p75)

Attempts had been made to include a question in the 1971 and 1981 censuses, and some discussion (as part of the debate on the inclusion of a question on ethnicity) took place before the 1991 census, which was the first to include a question on ethnic group (Sillitoe and White, 1992).

The impetus behind the desire for such a question prior to the 1971 and 1981 censuses came from some Christian bodies; the more recent pressure for a question has come from a wide range of religions. For groups representing many in the Asian community, religion was considered to be a more important indicator of identity than country of ethnic origin; for others religion may be more significant than skin colour or language (Kosmin, 1998). For groups established in the UK for much longer, Christians and Jews, ethnic and religion questions were considered important in understanding lifestyle choices and social provision, with religion potentially a more accurate predictor of cultural behaviour than the response to a question on ethnicity (Southworth, 2005).

Following on from this is the issue of what a question on religion is supposed to elucidate. According to Southworth (2005), religious adherence can theoretically be divided into three strands: belief, practices, and affiliation/belonging. Some groups opposed the inclusion of a religion question on the basis that a person's religion is a personal, private matter about which the state has no business to enquire (see, for example, Zellick, 1999). The argument by many of those favouring a question is that beliefs and practices are indeed a private matter, but a person's general affiliation to a particular religion impacts on their cultural outlook and social behaviour and needs, and is thus an important indicator of social processes, in the same way as employment status or ethnic origin. Ultimately, of course, the question on the England and Wales census asked simply 'What is your religion?' – leaving it to individual respondents to interpret what that might mean.

However, in order for a question on religion to be considered for inclusion in the census, it would need to pass certain tests. Southworth indicates ONS advice that

the question should: be 'acceptable to the public; information [should be] needed; not available from any other source; and testing must demonstrate that the question can be answered sufficiently accurately by the public, and yield a high enough quality of data to meet users' needs' (Southworth, 2005, p81).

There was some concern that the Census Act 1920 may not provide the authority to ask a question on religion. A private member's bill was drawn up, ultimately receiving royal assent as the Census (Amendment) Act 2000; this explicitly made the asking of a question on religion possible, and allowed it to be answered on a voluntary rather than mandatory basis. The government white paper (HM Treasury et al, 1999) indicates the reason for inclusion of the question was that it 'would help provide information which would supplement the output from the ethnicity question by identifying ethnic minority subgroups, particularly those originating from the Indian subcontinent, in terms of their religion'. Ultimately, it appears that, objectively, the argument for a question on religion did not have as strong a case as a question on English language proficiency, or income. Nevertheless, perhaps because the act was in place, and perhaps through particular government ministerial interest in the matter, the religion question was included in the 2001 census. Having been included in 2001, it was repeated in 2011.

The inclusion of a question on religion in 2001 thus had a long gestation period, largely repeating the lengthy process that preceded the inclusion of a question on ethnic group in 1991 (Sillitoe and White, 1992). In a similar vein, the absence of a specific 'Arab' category in the ethnic group question (remedied only in 2011) had been a concern to leaders of the Arab community in Britain and to academics (Nagel, 2001). A case for inclusion of such a category had been made in ONS's own formal report on the results of the ethnic group question in the 1991 census, in which Al-Rasheed (1996) attempted to unpick the 'Other-Other' (that is, not white, Asian, or Black) category, the largest element of which were Arabs. Indeed, this thesis makes considerable use of information gleaned from the response to the census question on ethnic group. As with the question on religion, the inclusion of the ethnic group question had an extended gestation period, and the interpretation of the outputs has been the subject of considerable discussion, as described in Appendix A to this thesis.

2.3 Availability of census data

ONS has published a vast amount of information following its processing of the 2001 and 2011 censuses. Given the government's drive for greater openness, and recognising that the census has been paid for by taxpayers, the majority of census output is freely available to anyone who wishes to acquire it, through online download. Certain, more detailed, types of output are restricted, so as to prevent disclosure and potential identification of individual persons or households, and maintain the confidentiality of returns that is enshrined in law.

In general terms, therefore, the relevant types of output tabulations available from the two most recent England and Wales censuses are as follows.

Published datasets from the 2001 and 2011 censuses

Religion-based tables produced for both censuses cover (for example): for individuals: usual residents, gender and age, country of birth, ethnic group, employment status, socio–economic status, general health, disability, and qualifications held; for households: housing tenure, car ownership, dwelling type, and household composition. These standard tables are produced for a range of geographies from England and Wales totals, down to output areas (OAs) each of which includes on average about 300 residents.

Commissioned tables from the 2001 census

Commissioned tables are paid for by the requesting individuals or organisation, but are placed in the public domain by ONS once completed, and cover various cross-tabulations that are not found in the standard output tables. Over 100 different tables, with a 'religion' element have been commissioned by various bodies. Some of these focus specifically on Jewish respondents and have been acquired from ONS for this project.

Commissioned tables from the 2011 census

About 50 tables with a religion theme are now available, including a small number with a particular Jewish focus. 2011 commissioned tables have been downloaded directly from the ONS website.

Sample of Anonymised Records (SARs) from the 2001 and 2011 censuses

These are datasets made up of samples of individual and household returns (rather than aggregate tabulations found in the standard tables) though they are anonymised by removing all names. The range of information transferred from the original census returns varies between the datasets, as does the level of geographic information included. The 2001 output includes a number of datasets:

- *The 2001 Individual Licensed SAR (IL-SAR)* – a 3% sample of individual records from the census with geography down to government office region. Within the sample, which can be accessed by researchers in higher education establishments, is information on about 7,500 Jewish individuals.
- *Small Area Microdata (SAM)* – a sample of 5% of the population of the UK, representing about 3 million individuals. The lowest geography is local authority and this file is also accessible by researchers in higher education establishments.
- *The Controlled Access Micro Data Samples (CAMS)* – more detailed versions of the SARs available for analysis in a 'safe-setting'. A more onerous process of researcher approval is associated with this file.

Access to the 2011 files is similarly restricted. The 'secure' microdata files consist of random samples of 10 per cent of people or households in the 2011 Census output database for England and Wales. Access to the secure microdata requires the more onerous process of achieving approved researcher status and the data can only be viewed at the ONS office at Titchfield, Hampshire. Two sets of 'secure microdata' have been released:

- *The individual secure file* that includes person level data on 258 variables for over 5 million individuals. The lowest level of geography available is local authority. Records include those resident in households and communal establishments.
- *The household secure file* that includes person and household level data on 245 variables for over 5 million individuals within more than 2.4 million households.

2011 'safeguarded' files have also been released, and have been accessed for this research. Each contains details of a 5% sample of the population (and thus

includes about 13,000 Jewish respondents). One file, known as *Individual safeguarded sample (region level),* includes an extensive amount of detail about those individuals and a very limited amount of information about the households in which most of them live, but provides geography only down to regional level. The other file, *Individual safeguarded sample (local authority),* includes slightly less detail, but provides place of residence information down to grouped local authority level. Both files are made available in a similar manner to the Individual Licence files for 2001 – that is, they are accessible to approved researchers in higher education via the UK Data Service.

Although SARs are available from the 1991 census, as no religion question was asked, they are not relevant to this study.

Special Migration Statistics (SMS) files for 2011

The census asks questions about journeys to work, and also whether a change of usual residential address has occurred in the twelve months leading up to census day. Output from these questions, in the form of origin-destination flow counts, is included in the SMS files. In a similar fashion to the microdata, the SMS files for change in residential location (of which there is a set categorised by religion) are made available as either 'safeguarded' or 'secure' files, depending on the level of geography included. The safeguarded version of the file (providing a matrix of house moves at local authority level) has been accessed as part of this study. Note that although 2001 SMS files were created, one based on religion was not produced, though a 2001 commissioned table, providing broadly equivalent information for Jewish respondents, was produced.

ONS Longitudinal Study

The ONS Longitudinal Study (LS) is a set of linked census records for individuals born on four selected dates in all years (about 1% of the population). The study includes records from the 1971, 1981, 1991, 2001 and 2011 censuses. It includes data on over 3,000 Jewish respondents. Although there was no religion question included in the 1971, 1981, or 1991 censuses, Jewish (and other religion respondents) from the 2001 and 2011 censuses will be linked with their data from the earlier years, allowing longer term information on migration (for example) to be derived. The LS has been accessed for this study via the Centre for Longitudinal

Study Information and User Support (CeLSIUS) team, based at University College London (UCL) and ONS, London.

In summary, therefore, the principal sources of data used in this study include:

- standard census output tables from the 2001 and 2011 censuses;
- a small number of tables commissioned by others from the 2001 and 2011 censuses;
- 2011 safeguarded individual microdata files
- 2011 safeguarded SMS files at local authority level; and
- information contained within the ONS LS files.

2.4 What has the religion question actually measured?

As with all secondary data (information collected without input from the researcher who intends to use it, possibly for an unrelated purpose), it is essential that the nature and meaning of the data are fully understood prior to their use.

In all surveys, the actual wording of questions and the context set by preceding, and sometimes subsequent, questions can have a bearing on what the respondent understands by the question and what 'motives' he or she attaches to the organisation setting the questions. These factors can frame the answers given (Blaikie, 2000; Voas and Bruce, 2004). Although the 2001 census religion questions in Scotland and Northern Ireland refer to both 'belong to' and 'brought up in', in England the religion question follows immediately after the country of birth and ethnicity questions and simply asks 'What is your religion?' (in Wales, a question on Welsh language skills splits the ethnicity and religion questions). Note that in 2011 the religion question in England (identical to that asked in 2001, except for the 'None' response being replaced by 'No religion') is separated from the ethnic origin question by questions on main language and ability to speak English; in Wales three language questions distance the ethnicity and religion questions from each other.

Whilst the words 'belong to' might be open to some interpretation, 'what is your religion?' (as asked in England and Wales) provides no real guidance at all, except the implication that one does have a religion (Voas and Bruce, 2004) – an

aspect partly countered by the first tick box being 'None' (in 2001) or 'No religion' (in 2011).

Prior to the implementation of the 2001 census, Kosmin (1998) noted that most religious groups do collect statistical information (with widely varying definitions of 'membership'), but that there is a paucity of data from independent sources. He forewarned that self-identification of religion might not be considered appropriate by some religious communities, and ended his paper by stating that 'census counts do not necessarily end debates about the size of religious groups' (op cit, p46).

Two particular papers illustrate his point; one relates to the numbers who ticked the 'Christian' box in the 2001 census (in England and Wales) and the second to those selecting the 'Jewish' box. Voas and Bruce (2004) focus on the Christian response rate, noting that the 72% of the population ticking the Christian box is a substantially larger proportion than found in the British Social Attitudes survey (54%) and a number of other surveys. Voas and Bruce's conclusion is that the difference can largely be explained through concerns about national identity, heightened by the proximity of the religion question to that on ethnicity, and the presence of specific (non-Christian) alternative tick box responses. In the Social Attitudes Survey (carried out by face to-face interview) the respondent is asked if he or she regards him or herself as belonging it any particular religion – the respondent does not see 'a list that includes Hindu, Muslim, and Sikh' (Voas and Bruce, 2004, p26).

In contrast, Graham and Waterman (2005) take a different view in considering the level of Jewish responses to the 2001 census religion question. They argue that many Jews 'are increasingly defining themselves in ethnic rather than religious terms' (op cit, p89) and that therefore, the census response to a question on religion undercounts the number of people with an overall cultural, ethnic, or religious affiliation with Judaism. Graham and Waterman also note two specific aspects relating to Jews that could lead to an under-responding. Firstly, suspicion 'of government-sponsored questionnaires requiring them to identify their religion' (op cit, p93), a remnant of experiences of the holocaust, for example the fate of the Jews of the Netherlands (Brasz, 2001); and, secondly, a biblical injunction against the counting of Jews (see Hosea, 2:1).

As evidence for a particular Jewish undercount (given that the religion question was, in any event, voluntary), Graham and Waterman draw attention to the non-response rate to the religion question. This averaged 7.7% across England and Wales – but was highest in the London Boroughs of Hackney and Haringey (at around 12%), the home of the largest concentration of strictly orthodox Jews in the UK, with Camden and Barnet (home to 20% of British Jews) also close to the top of the list.

The authors also report some findings from a questionnaire survey in Leeds and London, targeted at members of the Jewish community and, specifically asking them to recall their responses to the religion question on the 2001 census (as part of a much larger study). Although Graham and Waterman's view is that this information substantiates a Jewish undercount, it does not (in my view) substantiate that the response to the census question was more or less completely answered by Jews than by other residents of the UK. They assume that a study organised by a Jewish communal organisation would be responded to (insofar as defining what respondents implied by identifying themselves as 'Jewish') in a similar manner to the national census.

Graham and Waterman's conclusions are that the census has under-reported the number of Jews in the country, on the basis that Jews who regard their affiliation to the Jewish grouping as based on ethnic or secular/cultural grounds may have chosen not to tick the Jewish box on the religion question.

Voas (2007) provided a response to Graham and Waterman's paper. Whilst he is not convinced by Graham and Waterman's use of information from the London and Leeds questionnaires, he does accept that there is some evidence of a higher level of non-response to the religion question by Jews than by other groups. Voas's view is that the religion question has an ethnic nature to it, through its positioning on the form, and doubts that people who felt that their connection with the Jewish group was an ethnic one rather than based on religion would have been dissuaded from ticking the Jewish box in the religion question. Voas presents an analysis of the 50 wards that reported 10% or more Jewish residents in 2001, the level of non-response to the religion question in each of those wards, and the average level of non-response based on the classification of census wards carried out by ONS (see ONS, 2003). When these wards are listed in descending order of percentage correction required to

the Jewish count to bring those wards to the non-response value of their class, the first eight wards are all localities where the strictly orthodox Jewish communities are known to reside. In my view, Voas's analysis supports the concept of a Jewish undercount based on an aversion to disclosure of information to secular authorities and religious precepts, rather than an issue of secular/ethnic rather than religious affiliation to the Jewish group.

It is worth noting that analysis of the 2011 census outputs suggests that the issue of Jewish undercount has become much reduced. My calculations, based on the 50 most densely Jewish-populated electoral wards at each census, and separating the known strictly orthodox areas, are shown in Table 2.1. Note that Jews make up, overall, 19% of the population in these wards, so any variation in the failure to answer the religion question may not be solely associated with the attitude of the Jewish residents. Additionally, a number of the strictly orthodox wards are located in 'Inner City Multicultural' areas (ONS, 2003) that Voas (2007) had found to produce higher 'religion not stated' proportions than other area types (based on 2001 data).

Table 2.1 Proportion not responding to the religion question

Ward Group[3]	Proportion 'Religion Not Stated' 2001	Proportion 'Religion Not Stated' 2011
Strictly Orthodox	14.9%	9.5%
Other top 50 Jewish	9.0%	8.2%
All Wards	7.7%	7.2%

Source: Author calculations based on 2001 table KS007, and 2011 table KS209EW

The overall conclusion to the discussion is that it is difficult to produce a single figure in response to any question that relates to identity, and in which the form and context of questions may have an impact on responses. Indeed rather than reflecting social reality, the form of the question may play a role in constructing that reality. However, if census output is to be used to determine policy and have an impact on welfare provision (or be used in a research project), it is important that

[3] Note that ward boundaries were re-drawn between the censuses so the 2001 and 2011 figures are not absolutely comparable. The 2011 data omit wards in the London Borough of Camden due to an ONS error in assessing the 'religion not stated' proportions there. The strictly orthodox wards are found in Hackney, SE Haringey, south Barnet, east Salford, south Bury, and Gateshead (see Chapter 5).

what the data are intended to represent, and what their limitations are, are fully presented and understood.

Finally, it is worth pointing out that the issue of non-responses (a 'religion not stated' category is included in the census outputs) arises because the religion question was voluntary – for all other questions on the census, ONS imputes missing values from other similar cases. The religion outputs do not, however, reflect solely the information on returned census forms. Where ONS considers that whole households or individuals have failed to make a census return, results are imputed from other returns considered to be representative of the missing addresses (ONS 2012a, 2012b); the outputs for religion (and all other characteristics) thus include the values ascribed to imputed households and individuals. Indeed, in March 2015, ONS revealed an error (not fully correctable) in the way this had been carried out in three London boroughs with the main tabulations incorrectly assigning all imputed individuals to the 'religion not stated' category (ONS, 2015a).

So, where does all this leave a researcher wishing to make use of outputs from the census religion question? Firstly, the simplicity of the question has both benefits and drawbacks. It is likely that its meaning was interpreted differently by different people; however, additional words, or a supplementary explanation of the question, might have only caused a greater level of uncertainty, and perhaps led to a reduced response rate. The inclusion of 'membership' or 'belief' in the question may have made it clearer but, as such terms are interpreted differently by different groups, an additional source of bias would have been included. Give that the aim of the question was to provide an additional dimension to cultural identity, to assist with social policy development, rather than provide religion groups with an estimate of their membership numbers, the simplicity of the question can be welcomed.

Secondly, has the voluntary nature of the question (and thus its lower response rate than other questions) weakened the value of the information collected? The presence of a 'religion not stated' category in census outputs allows the data user to see more clearly the variation in response rates area by area. This needs to be contrasted with outputs for other questions (such as ethnic group), where ONS's imputation process 'shields' the user from response rate variation. In terms of absolute numbers, the voluntary nature of the question will have reduced the headline figures for all groups (and potentially more so for Jews than other groups, as

discussed above). However, if the focus of the research is on the socio-economic characteristics of 'members' of a group, or on spatial distribution (for example) the failure to respond by an element of the potential members of a group should have much less impact. Given that at both censuses between 7% and 8% of respondents did not answer the religion question, it would be easy to assume that there is a material element of the population who do not consider that one's association with a religion (or no religion) should be disclosed on a census form, and that such individuals may be disproportionately drawn from one socio-economic group or another and represent a possible source of bias. However, work by Simpson, Jivraj, and Warren (2014, p23, Table 7), examining individuals who had been linked between the 2001 and 2011 censuses through the ONS LS, shows that fewer than 1.1% of individuals did not respond to the question at both censuses – that is, overwhelmingly those who did not respond at one census did respond at the other; there is no distinct 'no responding' group. The issue of persistence in cultural identity over time, in respect of the Jewish group, is discussed further in Chapter 9.

In his pioneering work on Jewish demography in London, described in Chapter 3, Rosenbaum (1905) defined a Jew, retrospectively, as someone who was buried in a Jewish cemetery, and Neustatter (1955) used self-identification as her criterion. For the purposes of this study I have defined members of a religion as those who self-identified themselves as such in their census return, or were identified by the household member who completed the form on their behalf, or as imputed by ONS. That is, the values presented in the census output tables have been accepted at face value, without adjustment. There is no absolute way in which individuals can be allocated to cultural groups; the purpose to which the analysis is to be put must influence the approach. However for the purposes of this study, in which various groups are compared side by side (see Chapters 6 to 8), the use of census data as published provides a consistent approach. Insofar as estimating the Jewish population is concerned other bodies have used different definitions. The BoD's estimates (Schmool and Cohen, 1998) are based on circumcision, marriage, synagogue membership, and funeral data – and implicitly define a Jew as someone who avails him or herself of the services of a Jewish communal organisation at some point in their life; some discussion on the consistency between those estimates and census outputs can be found in Chapter 9.

2.5 Summary

The inclusion of a religion question in the 2001 and 2011 England and Wales censuses has provided data relating to around 260,000 Jewish respondents in each of these censuses. This level of data is a huge step-change from that which has been available previously, or could be procured in any new survey. Thus, it is inevitable and appropriate that the census output should take centre stage, with little purpose served (in the context of examining issues across the country as a whole) in considering the collection of new data as part of this study. Whilst there are some issues to be considered regarding what the response to the religion question indicates (given that the question was voluntary with no guidance on how to interpret it), these are more than counter-balanced by the quality of the census collection and analysis process, as set out in various quality-control documents produced by ONS (2009, 2013).

Census responses have been provided by millions of respondents and therefore ethical issues must be considered prior to their use in any study. However, ONS goes to extreme lengths to ensure the validity and confidentiality of data and the avoidance of disclosure/identification of individual respondents in the census outputs in general, in safeguarded and secure datasets and, particularly, the ONS LS. These considerations have been reported by Tudor, Cornish, and Spicer (2014) so that the public can be assured that confidentiality of their individual data is protected and users of the data can be re-assured that relevant ethical considerations (White and Breckenridge, 2014) have been addressed.

3. Background context

3.1 A history of Jewish settlement in Britain

Introduction

In order to make sense of the population geography of Jews in twenty-first century Britain, it is necessary to understand some of the background to the Jewish presence in the country with particular reference to its geographic distribution and size. This description covers the period to the end of the twentieth century – that is, prior to the 2001 census, and thus sets the scene for analysis of the large datasets on religion provided by the results of the 2001 and 2011 censuses.

The medieval period

It is generally accepted that the first significant presence of Jews in England followed the Norman Conquest of 1066 (Mundill, 2010). Mundill states that 'all accounts of Jewish settlement coinciding with the Conquest are unequivocal in suggesting that the first Jewish colonists came from Rouen' (op cit, p4). There were certainly sufficient number of Jews in Britain by 1070 for William I to make a royal pronouncement about them, giving them the King's protection and indicating that 'the king would treat both their persons and property as his own' (Golb, 1998, p114). By the middle of the twelfth century there were Jewish settlements in all the main towns of medieval England, including London, Winchester, Bristol, Oxford, Canterbury, Colchester, Norwich, Bedford, Hereford, Warwick, Lincoln, Nottingham, and York; and by 1290, Jews were settled in over 80 different places (Mundill, 2010), though it is estimated that they numbered no more than 0.25 percent of the population (Lipman, 1962). Towards the end of the thirteenth century, Lipman (1962) assesses the Jewish population of London at perhaps 1000, with 200 to 300 living in each of York and Lincoln and 100 to 200 in each of Norwich and Oxford, together with a number of smaller communities.

Throughout the thirteenth century there were numerous petitions and pronouncements excluding Jews from a number of towns, or enforcing their movement from one town to another (for example, Levy, 1902, regarding the expulsion from Leicester, and Allin, 1969, for Southampton). The situation continued to deteriorate culminating in King Edward I's decision in 1290 to reverse the policies of the preceding 200 years, and expel all Jews from England. The

precise reasons for the expulsion are not clear, though similar action had been taken by other rulers elsewhere in Europe (Mundill, 2010). According to Mundill, there is no clear picture as to what happened to the expelled Jews, though most will have travelled to France. The expulsion appears to have been complete, except for the few who converted to Christianity and small numbers who may have remained illegally.

The seventeenth century re-admission

England was not totally free of Jews between the expulsion of 1290 and the re-admission of the 1650s, though there was no permanent presence until the sixteenth century (Roth, 1964). Small groups arrived in London in 1520 and subsequent years. There was a further influx towards the end of the sixteenth century, but that settlement came to an end in 1609 following disputes within the group (Woolf, 1970). The true origin of the post re-admission community was a group of merchants of Spanish-Jewish origins (outwardly Christian-practising) who started to settle in London during the 1630s (Endelman, 2002). They themselves did not seek to have the expulsion of 1290 rescinded, and although Oliver Cromwell looked favourably on the idea of re-admission, he did not formally follow it through because of opposition from English merchants and protestant clergy (Endelman, 2002). Indeed, it was an external event that both brought the matter to a head, and also allowed it to be resolved without government decree. In 1655 England went to war with Spain; this meant that those Iberian 'New Christian' residents of London, outwardly expressing allegiance to the Catholic faith, were liable to have their assets seized as enemy aliens. This forced some of them to openly profess to be Jews (and Portuguese rather than Spanish) to avoid imprisonment or bankruptcy. In March 1656 members of the community petitioned Cromwell for the right to hold Jewish services and to purchase a burial ground. The petition was not resolved (Endelman, 2002); indeed, it has never been resolved – there has never been a formal repeal of the 1290 exclusion, or a formal document of re-admission, or indeed any document setting down conditions and restraints on Jews in England (which had been the usual pattern in other countries). At the end of 1656 a building was purchased to be used as a synagogue, and land purchased in 1657 for a burial ground at Mile End. The community outgrew the synagogue building, and in 1699 purchased a site in Bevis Marks in the City of London; the synagogue, completed in 1701, is still in use today (Endelman, 2002). There were moves to expel Jews from England after the

monarchy was restored in 1660, but these were all refused by Charles II, James II, and William III – each for the own quite different reasons (Samuel, 1960).

Prior to 1656 there were perhaps twenty 'New Christian' families in London, and this increased at only a slow rate, as other Sephardi Jews from the Netherlands (largely of Iberian origin) began to arrive. By 1670 there were about 35 families (Samuel, 1960). Twenty five years later the number of Sephardi Jews reached 499; a smaller number of Ashkenazi (German/Eastern European) Jews had also settled in England by the end of the century (Endelman, 2002). The community included a number of international trading merchants, of whom a very small proportion were wealthy, and also included a number of dealers and physicians (Woolf, 1970).

From 1700 to 1880

Although the first Jews to take advantage of the 're-admission' were mainly Sephardim (that is, of Iberian/Mediterranean origin and practice), Ashkenazi Jews (of German and central European practice) soon followed and by 1720 they outnumbered the Sephardim; indeed a sufficient number had arrived by 1790 for them to procure their own Ashkenazi synagogue in Duke's Place, later referred to as the Great Synagogue (and lost in the 1941 blitz). By the middle of the eighteenth century it is estimated that there were seven to eight thousand Jews in England, of whom about two thirds were Ashkenazim, and during the early part of the nineteenth century the Jewish population was of the order of twelve to fifteen thousand. The Sephardic portion had, however, remained almost static at a little over 2000 persons (Endelman, 1979; Lipman, 1971). Some of the growth in Ashkenazi Jews was by natural increase, but most was from a continuing arrival of poor Jews from continental Europe – about six thousand in the first half of the eighteenth century, and eight to ten thousand during the next sixty years (Endelman, 1979). Many travelled to England because of poor economic prospects in Continental Europe, restrictions on, or prohibition from, settling in many towns and jurisdictions, and reduced opportunities in the German states due to the arrival in those states of many Jews from Poland. There were a smaller number (about 3000) of Sephardi immigrants during the eighteenth century particularly between 1720 and 1735, due to increased inquisition activity in Spain and Portugal. Unlike the arrivals a century before, most of these Jews were impoverished (Lipman, 1971). However, the general increase in prosperity for the wider community during the eighteenth century

(and Britain's emergence as a major economic power) allowed Jews to climb the social scale, with hawkers and second-hand salesman acquiring fixed shops, and shopkeepers becoming wholesalers and importers.

The late seventeenth century community was focused in the City of London and the area immediately to the east, and this continued for several decades. Also in this period, twenty towns outside of London had Jewish communities; the largest were port-related communities in Chatham, Portsmouth and Plymouth, and large market/county towns such as Canterbury, Exeter, Gloucester, Norwich, and Oxford (all in the south and east of England). In most cases each was the home to fewer than ten families; Portsmouth was the largest provincial community with fifty families by the end of the century (Endelman, 2002). The wealthiest members of the London Jewish community followed the path trodden by the wealthier members of the wider community and bought residences in the villages to the north and west of the city in Richmond, Twickenham, Hampstead, and Highgate (Endelman, 1979) – an early example of counter-urbanisation (Champion and Atkins, 1996); a topic re-visited in Chapter 8. The level of religious observance, particularly amongst the uppermost and lowest echelons of the community (the former due to assimilation, the latter due to ignorance) was a source of concern to rabbinic authorities (Duschinsky, 1918).

Despite the social advancement of a minority of Jews during the eighteenth century, in 1800 most Jews in England were still relatively impoverished, poorly educated, and in low-status trades, and were either immigrants themselves or the children of immigrants. However during the eighty years between the start of the nineteenth century, and the commencement of mass-immigration from Eastern Europe, the Jewish community was to be transformed; most of this change occurred between 1850 and 1880. In two or three generations the majority of Jews would be native English speakers, British citizens, and largely middle-class, with their identities shaped by the surrounding culture, even if many of their neighbours still viewed them with some suspicion (Endelman, 2002).

Alderman (1998) provides a summary of the various estimates of the Jewish population of Britain made for the middle part of the nineteenth century (see also Goldsmid, 1830; Blunt, 1830; Mayhew, 1851; Mills, 1853). Alderman's conclusion is that by the middle of the nineteenth century, the Jewish population of London

stood at 20,000 to 25,000, with a total for the United Kingdom of 30,000 to 35,000. During the course of the century the balance of population in the provincial centres varied. With the end of the Napoleonic wars, port communities (for example Plymouth, Portsmouth, and Chatham) started to decline, whereas northern cities, rapidly expanding through the industrial revolution, grew quickly. By 1851 there were about 1500 Jews in Liverpool, 1100 in Manchester, and 780 in Birmingham. Other industrial towns had smaller communities including Glasgow (home for a measurable number of Jews in Scotland, for the first time) and Hull (a trans-migration port) (Endelman, 2002; Lipman, 1951; Williams, 1976; Levy, 1955).

Those German immigrants who did arrive after 1830 tended to be drawn from the ranks of merchants and clerks (rather than the impoverished) due to England's mercantile and industrial standing (Endelman, 1991). However, smaller numbers of impoverished Jews from the Russian Empire did make their way to Britain throughout the early and middle eighteenth century (that is, before the mass migration of 1881 onwards), such that by 1851 a quarter of the Jewish population of Birmingham and Manchester was from eastern Europe, and were in need of assistance from the more established members of the community (Josephs and Shapiro, 1980; Williams, 1976).

The 'upward mobility' of the Jewish community in general is reported by Lipman (1967) who estimated that in 1850 around one-third of London Jewry could be considered as upper or middle class, and that this had risen to at least half by 1880, though the proportions were much lower elsewhere. In London a small number of families who derived their wealth from the financial sector dominated communal organisations, whereas Manchester was dominated by those in the cotton, clothing, and jewellery sectors.

During the early part of the nineteenth century Jews of all financial standings lived in close proximity to each other but, as the decades passed, the more affluent sought to live in different areas to their less well-off brethren, moving to the West End, Finsbury, and Bloomsbury. Middle-class families started to move out towards Islington, Highbury, and St John's Wood; the less affluent middle class moving northwards to Hackney and Dalston from 1870 (Endelman, 1979; Lipman, 1954). In making these moves, the Jews were following a similar pattern to those in the wider community who found themselves in improved circumstances; there was,

however, a tendency for Jews to move to a reduced range of places, implying that there was a need to maintain Jewish identity at least to some degree. This concept of suburbanisation whilst maintaining a degree of group congregation, and its application in the twenty-first century, is discussed in Chapter 6.

Mass immigration (1880 to 1914)

The year 1881 marks the start of the period of mass immigration of poor Jews from Eastern Europe (primarily the Russian Empire). Although there had been a steady stream of eastern European immigrants over the preceding forty years, these numbers were dwarfed by the post 1880 situation. Endelman (2002) observes that 'between 1881 and 1914, 120,000 to 150,000 East European Jews settled permanently in Great Britain, effecting a radical transformation in the character of Anglo-Jewry' (p127; see also Lipman, 1954). An English-speaking, significantly middle-class community became, once again, predominantly a foreign-born, foreign (Yiddish) speaking, lower-class society.

Although the most visible catalyst for the major increase in migration was the pogroms that swept through Bessarabia and Ukraine in 1881, most of those who travelled were not from those areas. The pogroms were simply one additional reason for leaving. The economic situation for Jews in Eastern Europe had been deteriorating for some time, in part because growth of the Jewish economy could not keep pace with increasing Jewish population. Harsh governmental measures – designed on the one hand to 'russify' the Jews, or on the other to segregate them from the Russian peasantry – also took their toll (Rogger, 1986).

Immigration to Britain peaked between 1903 and 1906, when some restrictions on immigration were put in place. About two-thirds of Jewish immigrants settled in London, and overwhelmingly in the East End – where there was an already well-established network of synagogues, employment opportunities, and relatively recently arrived Yiddish-speaking eastern European Jews. Small numbers of Jews found their way to most parts of the British Isles. However, by 1914, when the Jewish population was estimated at 300,000, over 80% of the community was to be found in just six localities – London (180,000), Manchester (30,000), Leeds (20,000), Liverpool (8,000), Glasgow (7,500), and Birmingham (6,000) (Endelman, 2002; Freedman, 1992). Reference to the relative importance of the London area and the changing balance in the Jewish population in other parts of

the country in the modern era is a topic addressed in the later chapters of this thesis. Small communities developed in a number of manufacturing and industrial towns, including the South Wales valley towns (Henriques, 1993), and in disembarking ports on the east coast, such as Newcastle, Hull and Grimsby (Gerlis and Gerlis, 1986), as well as the principal towns in Ireland – Belfast, Cork, Limerick, and Dublin (Endelman, 2002). The majority of the new immigrants made their living either in the retail trade or small workshops, generally making use of skills that they brought with them. Whilst not necessarily strictly observant, the immigrants preferred to set up their own synagogues, regarding the somewhat 'anglicised' attire and atmosphere of the long-established synagogues alien.

Starting before 1900, a number of the immigrants were able to move from the heart of the East End to the surrounding areas – such as Stepney Green, Bow, and Poplar, or north to Hackney, and west to Soho and Notting Hill. In Manchester some had moved from the Red Bank/Strangeways area to Hightown and Higher Broughton, and in Leeds from Leylands to Camp Road and Chapeltown (Endelman, 2002; Williams, 1990).

The presence of significant numbers of imhouseJews, particularly in the overcrowded conditions of London's East End, exacerbated general 'anti-alien' sympathies of many of the British public. The established Jewish community was concerned about its own position in society and sought to 'anglicise' new immigrants a quickly as possible. Efforts were targeted more at children and young adults who were thought to be more open to changing their habits. Schools were set up with lessons in English, deliberately attempting to eradicate the use of Yiddish (Gartner, 1973). The Jewish Lads' Brigade (modelled along the lines of the Church Lads' Brigade) was set up to provide physical training, to refute charges that Jews were 'undersized, undeveloped, weak, and sickly' (Endelman, 2002, p 190), and turn them into patriotic, obedient, English gentleman (Kadish, 1995).

In parallel, there were moves to update Judaism. The movement that eventually became Liberal Judaism took form during this period, and there were some small changes to the forms of service in mainstream synagogues (Endelman, 2002). These moves only increased the wariness of the immigrant congregations of the established community's organisations. However, although there were tensions at a religious level, the majority of immigrants did not want to re-create the eastern

European way of life in Britain. Many regarded their move to Britain as a new opportunity, particularly for their children (Endelman, 2002).

Two world wars

The declaration of the First World War in 1914 served only to highlight the differences between the old/established community, and those who had arrived mainly since 1880. Middle-class Jews 'responded to the call to arms with enthusiasm' (Endelman, 2002, p183) through genuine feelings of patriotism towards Britain. The immigrant community was somewhat less keen – for generations the regimes under which they had lived had deliberately excluded them from mainstream society, so they had no experience of association with their host country and, more specifically in this case, they would be signing up to fight alongside the hated Russian Empire (Endelman, 2002).

Of course, as time passed, the proportion of Jews in the East End (and other 'immigrant' communities in the major provincial cities) who were British-born, English-speaking, and exposed even in a limited way to British culture increased. The locally-born generation became 'clerks, typists, shop assistants, and travellers' (Endelman, 2002, p196). They also moved out of the East End, initially to the surrounding areas of Hackney, Stoke Newington, Stamford Hill and West Ham (and Cheetham Hill in Manchester, and Chapeltown in Leeds) (Godley, 1996). Later in the inter-war period, many Jews moved to the north-west suburbs of Hampstead, Golders Green, Finchley and Hendon. Later chapters of the thesis highlight the continuing outward movement of Jews in the twenty-first century. Prior to World War I, the East End was home to around two-thirds of London Jewry; by the 1930s this had reduced to one third, with the north-west suburbs containing about 10% of the population. Moreover, the East End was now home to an increasingly ageing population with few children (a minimal level of immigration meant that those leaving the area were not replaced by newcomers), leading to the closure of the majority of Jewish schools in the area (Endelman, 2002).

The rise in anti-Semitism, and (in the 1930s) British fascism, led to an increasingly active interest from British-born Jews in the politics of the left. This included significant membership of the Communist Party of Great Britain in east London (Srebrnik, 1995); the formation of major organisations to combat fascism; and to protest about Hitler's rise to power in Germany (Endelman, 2002). Arising

from the turmoil in Germany, about 11,000 Jews were admitted to Britain between 1933 and November 1938 and the government allowed a further 44,000 Jewish refugees into Britain immediately prior to World War II (London, 2000).

This period also saw a significant change in religious outlook. Between the two World Wars at least ten Reform or Liberal Jewish congregations were established. At the other end of the spectrum, there continued to be friction between the smaller immigrant-based orthodox congregations and the 'established' mainstream organisation (the United Synagogue with its Chief Rabbi) which the more orthodox communities regarded as too 'anglicised' and too eager to accommodate a watering-down of Jewish religious practice. These congregations (and a small number in the provinces) kept the mainstream communal bodies at arm's length with the small Gateshead community deciding to establish its own yeshiva (advanced school of religious learning) in 1929 (Endelman, 2002) – an event whose impact can be clearly seen today in the analysis presented in Chapters 5 and 9.

Whilst Anglo-Jewry avoided the direct impact of the Holocaust, the Second World War did bring about major changes. Heavy bombing of the East End led to mass evacuation of children and many parents to areas of the country were there were few Jews, and limited if any access to kosher food. Many did not return to their roots - the Jewish population of the Borough of Stepney (covering the East End) halved from 60,000 to fewer than 30,000 by 1945. Sixty-two thousand Jewish servicemen and women were dispersed across many different units of the armed forces; many had limited contact with Jewish chaplains, and many encountered anti-Semitism on a direct personal level for the first time. For some this strengthened their connection with Judaism, for others it weakened it (Endelman, 2002).

Modern times

War damage merely served to accelerate the Jewish exodus from the East End. By the 1950s, Hackney had the largest Jewish population of the Metropolitan Boroughs (Brotz, 1955). More Jews moved to the north-west suburbs mentioned previously (and beyond) and also eastwards to Ilford and Woodford. This suburbanisation has continued through the recent decades such that a significant proportion of London Jewry now resides beyond the Greater London boundary – in south Hertfordshire and in Epping Forest (Schmool and Cohen, 1998). This pattern was repeated in all the major provincial communities; the once traditional Jewish

areas being ‘abandoned’ and occupied by the next wave of immigrants from other parts of the world (Castles and Miller, 2009).

In addition, however, provincial Jews were drawn back towards London. The Liverpool community, numbering about 7500 in the 1930s, fell back to 6000 by the early 1980s and around 3000 in the 1990s. In Leeds, the reduction was from around 18,000 in the 1950s to 10,000 in 1995, and the downward trend has continued since then. From a position in the pre-mass immigration period of the nineteenth century when London was the home for the overwhelming majority of British Jews, to a position in 1950 when fewer than 60% of Jews lived in the London area, by 1995 the proportion again exceeded 70% (Schmool and Cohen, 1998).

In the post-war decade, most families with an eastern European background continued to have a strong attachment to being Jewish; the close friends and marriage partners of the children and grandchildren of immigrants were still largely Jewish. The same could not be said for those families who had arrived in Britain before the era of mass immigration (Endelman, 1999).

As the century progressed Anglo-Jewry became increasingly ‘middle class’. By the end of the century, only 6% of Jewish men (aged 18 to 64) were manual workers, and 86% were in semi-professional, managerial, and professional occupations (Schmool and Cohen, 1998). Secular academic achievement, which was not a significant feature for Jews pre-War or immediately afterwards (about 3000 Jews attended university in the 1950s), progressively increased during the remainder of the century, such that by the end of the century half of all Jewish 18 to 29 year olds had or were completing a university degree (Schmool and Cohen, 1998). The influence of these patterns of socio-economic progress and educational attainment underpin much of the twenty-first century analysis of spatial distribution and internal migration addressed in Chapters 5 to 8 of this thesis.

The number of Jewish marriages has been declining since the 1970s – falling from 1800 per year to 900 per year in the 1990s, although some of the decline was as a result of cohabitation rather than marriage outside of the faith. Combined with falling birth rates, the overall British Jewish population, having peaked at about 430,000 in 1950, declined to about 285,000 in the mid-1990s (Schmool and Cohen, 1998). Only the strictly orthodox section of the community was bucking the overall downward trend. Between 1974 and 1996 the number of marriages conducted by the

Union of Orthodox Hebrew Congregations (the umbrella organisation of the majority of strictly-orthodox communities) grew by 42%, lifting their overall share of Jewish marriages from 7% to 21% (Schmool and Cohen, 1998).

Historically, the level of religious observance had declined in succeeding generations, so the upturn in the strictly orthodox groups was unexpected. These groups included about 3000 families in the mid-1950s, but they had more than doubled in size to 6600 in the mid-1990s (Schmool and Cohen, 1998) – largely through early marriage and large families, and very little assimilation.

The position of Anglo-Jewry at the end of the twentieth century, and the changes that occurred since the end of World War II, are encapsulated in this quote from Endelman.

> Economic mobility and suburbanisation, already under way in the interwar years, accelerated. Jews, women as well as men now, entered the professions and the new service industries in increasingly large numbers. By the end of the century, little remained of an inner-city Jewish working class. Anti-Semitism declined – fitfully and unevenly, to be sure – and Jews were appointed to high-profile positions in government, the universities, and public life. … Assimilation worried religious and lay leaders as never before, threatening, for the first time, the demographic health of the community … What was unexpected, however, was the new vitality and numerical expansion of strict Orthodoxy.
>
> (Endelman 2002, p229)

3.2 Non-census based Jewish demographic and population studies in the UK

Introduction

Complementing research into the general history of the development of Anglo-Jewry has been a body of twentieth century work examining the demography of the group. Publications relating to demographic and population studies of Anglo-Jewry fall into a number of categories:

- use of mortality data to estimate population size;
- other national studies; and
- local studies,

each of which is presented in a section below.

Use of mortality data to estimate population size

There has been a long history of using mortality as a source for estimating the overall size of the London or British Jewish population, stretching back more than 100 years. The absence of a question on affiliation to a religion in England and Wales censuses prior to 2001 meant that indirect methods had to be adopted by any organisation or researcher wishing to estimate the size of the Jewish population. Fortunately, the practice of Jews to be buried in specific Jewish cemeteries (or cemetery sections) has meant that (comprehensive) data on Jewish deaths/burials could be collated – hence a 'fascination' with use of mortality data to predict population size.

The earliest evidence of such research is Rosenbaum's report to the Royal Statistical Society in 1905 (Rosenbaum, 1905). Certainly, this ground-breaking work has informed all similar studies over the next century. In the paper's introduction, Rosenbaum bemoaned the absence of a question on religion in censuses leading to an absence of analysis of that area of human life. He noted 'that the difficulties will probably never be overcome by any method short of a special census in which it is incumbent upon each person to return the confession with which he desires to be associated' (Rosenbaum, 1905, p526). Rosenbaum also confronted a key question faced by all researchers of Jewish demography – defining who is a Jew. After considering a number of possibilities, he concluded that 'in practice and for statistical purposes a Jew is best defined as one who when he dies is buried in a Jewish cemetery' (op cit, p527). Most studies based on mortality statistics have either implicitly or explicitly adopted such a definition. Clearly, it can only be applied retrospectively; modern analyses, with access to census data, have had to re-address the question – as already referred to in Chapter 2.

Rosenbaum's principal sources of data were the 1899 to 1903 returns from the Burial Board of the United Synagogue of London. He calculated the age distribution and gender split for Jews and compared these with equivalent information for the wider populace of London and for England and Wales. He set out some comparisons of infant mortality and median age at death, and also presented some limited information provided by Jewish burial organisations in Glasgow and Manchester.

In order to produce an estimate of the Jewish population against which the mortality figures could be assessed, Rosenbaum looked to data on Russian, Polish and Romanian born immigrants in the 1901 census (of whom 80% of those in the London area were resident in the Metropolitan Borough of Stepney, and whom he assumed to be overwhelmingly Jewish). Indeed, by making use of marriage data from the Registrar General's annual report for Stepney and the surrounding boroughs, and proportions of foreign-born people in the same areas, Rosenbaum developed a methodology for estimating the number of Jews by gender and age band for the Borough of Stepney. Prudently, he noted, 'This table represents, I believe, the first attempt to distribute the Jewish population of London or of any part of it according to age and sex. It would be difficult if not impossible to say how near these figures are to the truth, ie what is the probable error.' (Rosenbaum 1905, p541). Rosenbaum estimated the Jewish population of the Borough of Stepney as 120,000 for 1901, and for London as a whole as 144,000. He estimated the Jewish population of the UK at 240,000.

Despite the novelty and breadth of coverage in Rosenbaum's paper, it does not appear to have immediately generated any further research or response. Indeed, Rosenbaum himself did not take the research further – the only other paper authored by him that can still be located was an analysis of the results of the 1910 UK general election, presented to the Royal Statistical Society in 1910 (Rosenbaum, 1910).

In 1933, Trachtenberg published a paper on estimating the Jewish population of London (Trachtenberg, 1933). He similarly bemoaned the absence of a suitable census and made use of burial returns for Jewish cemeteries. Trachtenberg's approach was to assume the same death rates by age and gender for Jews as had been established by the Registrar General for London, and applying those rates to the death returns by age and gender for 1929. His estimate for the Jewish population for the Administrative County of London in 1929 was 183,000 (4.1% of the London population). Kantorowitsch expanded on Trachtenberg's work by looking at death data for the five years from 1929 to 1933 (Kantorowitsch, 1936). He also indicated that in order to assess trends in population, statistics on Jewish births would be needed, and recommended collecting data on the number of Jewish circumcisions – an idea not formally put into practice until almost 40 years later (see Prais and Schmool, 1971; Kosmin, 1985).

The BoD set up its Statistical and Demographic Research unit (later known as the Community Research Unit) in 1965. This provided a focal point for demographic research. One of the first papers produced by the unit (Prais and Schmool, 1968) provided a further example of use of death returns to produce estimates of overall population size. Praise and Schmool used data for the 1960-65 period, obtaining detailed age and gender breakdowns from burial organisations, arriving at an estimated Jewish population for the London area of 280,000, and 130,000 for other communities.

By the 1980s the approach had become rather more sophisticated, but estimating the Jewish population still took the same basic approach – making use of burial returns by gender and age. Haberman, Kosmin, and Levy (1983) used data from 1975 to 1979 with a number of potential adjustments to the England and Wales population age-related death rates to produce a range of population estimates. The BoD updated the exercise using data for burials for the 1984-88 period, further raising the level of sophistication (Haberman and Schmool, 1995). Detailed data were collected from all burial societies, now including place of death and place of residence immediately prior to death, allowing burials associated with the major Jewish cemeteries at the edge of Greater London to be accurately allocated as relating to persons resident within Greater London or in the adjacent counties. Adjustments were made in the analysis to attempt to allow for differentials in death rates between Jews and the population as a whole, including some socio-economic adjustments. This was the last major attempt to quantify the size of the Anglo-Jewish population prior to the 2001 national census, which included a question on religious affiliation.

Other national studies

A number of non-mortality based investigations were carried out in the pre-2001 census era. In a wide-ranging investigation, Neustatter (1955) drew attention to the absence of information on religious affiliation in census returns and on the difficulties of defining who is a Jew. Whilst noting the choice of burial definition used in previous studies, she concluded that 'the definition of a Jew chosen in this essay is essentially one involving self-identification' (op cit, pp60-61), noting that this was consistent with the definition adopted in countries where a question on religion is included on census forms. As well as Kantorowitsch's (1936) analysis,

Neustatter's sources included 55 returns of a questionnaire issued to 110 provincial communities in 1950, and 1666 household questionnaires (of 12,000 issued) returned in 1950-52. Based on somewhat limited data, and also making reference to some overseas information, Neustatter presented a discussion on family size, marriage rates, inter-marriage, age structure, death rates, and reproduction (fertility) rates, and some socio-economic and occupational aspects. The essay is supported by seventeen tables, largely derived from the household questionnaires.

A report on Jewish marriages in Britain between 1901 and 1965 was published by the BoD (Prais and Schmool, 1967). The authors attempted to obtain comprehensive data on all Jewish marriages (marriages between two Jewish people, carried out under the auspices of a synagogue). The report indicates a Jewish marriage rate (per thousand persons per annum) falling from 9.9 in the first decade of the twentieth century, to between 7.3 and 8.4 during the next four decades of the century, with a sudden fall to below 5.0 for the 1950s, reaching 4.0 for the 1961-65 period. The rate for the wider population averaged around eight per thousand throughout this period. Much of the report attempts to identify the reasons for the halving of the rate over the latter decades. The authors note a negative relationship between marriage rate and proportion of participants born in the UK, which may be indicative of increasing marriage outside of the Jewish group dependent on the number of generations that families have been present in the UK.

This report, and its 1991 follow up, Schmool (1991), formed the foundation for a series of annual (and more recently biennial) reports on Community Statistics, produced by the BoD (see, for example, Graham and Vulkan, 2007a, 2007b, 2008; Vulkan, 2012, 2013). These reports provide information on the number of Jewish births (based on an extrapolation of circumcision records), marriages (sourced from the same or successor bodies to those used by Prais and Schmool), and deaths (again using similar sources to those used by previous researchers) for the latest one or two years. The reports also include comparisons with earlier years and are a useful source of national figures. The BoD has also produced (generally at 5-yearly intervals) a series of reports identifying the level of synagogue membership across the various 'denominations' of Jewish religious affiliation. The most recent of these reports are by Hart and Kafka (2006) and Graham and Vulkan (2010).

Based on all this background data collation and analysis, and also bringing together information from other sources, the BoD has produced two publications that can be regarded as important compendia on the demography and population geography of British Jewry (Waterman and Kosmin, 1986; Schmool and Cohen, 1998); the latter bringing the former up to date (and already referred to in the section on the history of the community). Whilst neither report discusses the likely level of statistical error in the information they present, the scope of the estimates analysed and summarised in both reports can be regarded as ingenious, given the absence of information on religious affiliation in the national censuses carried out prior to their publication. The report produced by Abramson, Graham, and Boyd (2011) effectively extends this series of compendium reports. Whilst it was intended to focus on poverty, the elderly and children, as with the previous reports it pulls together a wide range of demographic and socio-economic data gleaned from a number of existing surveys, covering topics of demography, poverty, education, social care, and Jewish identity.

The Institute for Jewish Policy Research (JPR) carried out a national survey in July to October 1995 – in the form of 2194 postal questionnaires. That survey forms the backdrop to a number of reports, including Goldberg and Kosmin's (1997) study into the social attitude of unmarried young Jews. More recently, JPR facilitated a survey of Jewish students – an online questionnaire carried out in February and March 2011, with 925 student respondents from 95 academic institutions, followed by focus groups (Graham and Boyd, 2011).

A social attitude survey of British Jewry, led by JPR, was carried out in 2013 and 2014 (Graham, Staetsky, and Boyd, 2014). JPR refers to this survey as the National Jewish Community Survey (NJCS), and it was conducted by means of an online questionnaire. The mechanics of the survey were organised by Ipsos MORI, but the questionnaire preparation and analysis were carried out by JPR in conjunction with a steering group. Up to 55,000 emails were sent out via more than 20 seed organisations (media bodies, synagogual organisations, Jewish online networks, and key community representative organisations) and recipients were encouraged to widen the sample through 'snowballing' (Goodman, 1961). In total 3736 valid questionnaires were completed in June and July 2013; little more than a 1% sample of the Jewish population. Interestingly, a comparison was also made with an Ipsos

MORI control panel that had previously identified themselves as Jews in other surveys (and were considered by the JPR team to be more representative of British Jews as a whole). A comparison of responses from the panel and the main dataset showed that 'the prevalence of key types of Jewish religious behaviour (frequent synagogue attendance, keeping kosher, celebrating Shabbat [the Sabbath] and marking major Jewish holidays) was, on average, 8.6 percentage points lower in the panel than in the main NJCS dataset' (Graham, Staetsky, and Boyd, 2014, p42). Output from the survey thus needs to be interpreted in that context.

Local studies since 1975

There are a number of recent and relatively-recent studies with a significant level of demographic or socio-economic-related reporting based on some form of survey of the Jewish population. Two warrant particular mention.

The first is Kosmin and Grizzard's (1975) assessment of the characteristics of the Jews of Hackney. Notwithstanding the lack of a religion question in the 1971 census, this astute study made use of detailed information contained in that census, and identified Jewish residents (and other groupings) by manually trawling the Hackney electoral roll using a Jewish surname and forename technique.

The second is Vulkan and Graham's (2008) analysis of the demography of Britain's haredi/strictly orthodox communities, with a focus on Stamford Hill and Broughton Park. This study presents a detailed quantitative analysis of births, schoolchildren, marriage, and migration, using a range of specialist publications, with some reference to 2001 census data.

Other statistically informed studies include: Redbridge (DeLange and Kosmin, 1979; Kosmin, Levy, and Wigodsky, 1979; Kosmin and Levy, 1981, 1983); Sheffield (Kosmin, Bauer, and Grizzard, 1976); Leeds (Waterman, 2003); the London area (Becher et al, 2002; Graham, 2003); Stamford Hill (Holman and Holman, 2002); and Broughton Park (Valins, 2003).

3.3 Other small population groups

As indicated in the introductory chapter, three of the chapters of this thesis include analysis of other small population groups, assessing them alongside the Jewish group. The following text provides a brief introduction to those groups as

background to the analysis of their spatial distribution and internal migration in England and Wales.

Arabs

Al-Rasheed's contribution to Volume 2 of the ONS report on the results of the ethnic group question in the 1991 census provides a useful summary of the Arab presence in Britain (Al-Rasheed, 1996). As with most groups, there is some evidence of medieval and earlier links. However, in the nineteenth century Arab merchants were attracted to Lancashire because of the cotton trade, such that by the end of that century 'up to 150 merchant houses had been established in Manchester' (Al-Rasheed, 1996, p209; see also Halliday, 1992). Much of this early settlement was by non-Muslims, primarily Syrians and Lebanese Christians seeking to leave the Ottoman Empire; these were joined by Fasi (from Fez) Muslims and later small numbers of other Moroccans. Later, Yemeni seamen started to settle in Manchester, and also in a number of ports, including Liverpool, South Shields, Hull, Cardiff and London (Al-Rasheed, 1996; Halliday, 2010). According to Jalili (undated c2006, p1) 'by 1948 there were nearly a thousand Arabs in Tyneside'. Yemeni numbers are thought to have reached 10,000 by the 1960s (Al-Rasheed, 1996), and Yemeni seafarers were followed by smaller numbers from Somalia. An increase in the Somali presence (particularly in London) in the 1980s was the result of political persecution at home (El-Solh, 1991).

Since the Second World War there has been labour migration, particularly from Egypt, Lebanon and Morocco, of both unskilled and highly skilled workers, and some involuntary migrations from the Palestine area and Iraq (Al-Rasheed, 1996).

Arabs in Britain have thus arrived from a wide range of countries across the Arab world. As to the current size of the Arab population of Britain, the 2011 census figure (230,000 for England and Wales) is somewhat smaller than the pre-census expectation of the National Association of British Arabs, who estimated the figure at 500,000 (Jalili, undated c2006).

Bangladeshis

'Bangladeshi migration to Britain dates back to the time of the East India Company in the 18th and 19th centuries, when lodging houses were set up for lascars[4]' (Eade, Vamplew, and Peach, 1996, p150). However this did not result in a permanent presence in Britain. Although the sovereign country of Bangladesh was not formed until 1971 (when the former East Bengal or East Pakistan region seceded from Pakistan), the 1950s and 1960s marks the start of the modern East Bengali / Bangladeshi community in Britain. Despite the size and population of Bangladesh, the majority of Bangladeshis living in Britain originate in a relatively small number of administrative sub-districts in the north eastern district of Sylhet (Eade and Garbin, 2006; Ballard, 2004). By 1961, the Bangladeshi population in Britain was estimated at 6,000, rising to 22,000 by 1971 (Eade, Vamplew, and Peach, 1996).

Sylhet's land tenure system of small landowner lineages provided sufficient resources to finance the initial departure of young men, initially to Kolkata, and subsequently overseas (Eade and Garbin, 2006). The initial arrivals in the UK were thus predominantly young men. Subsequent 'chain migration' and family re-union led to a more balanced age and gender profile of migrants. The 1991 census, the first to separately enumerate Bangladeshis (and other ethnic groups) identified a highly skewed population pyramid for the group, with a large bulge in 50 to 65 year old non-UK born males – reflecting the arrival of young men in the 1960s. That census also indicated that the Bangladeshi community had a far higher proportion of its population living in married couple with dependent children households than all other (including white) ethnic groups (Eade, Vamplew, and Peach, 1996).

The Bangladeshi group is recognised as the most recently arrived of the Commonwealth-based minority groups in Britain (Eade, Vamplew, and Peach, 1996) with the peak level of immigration occurring in the 1980s (Burholt, 2004). High fertility levels have meant that the Bangladeshi population has been fast growing, with the population estimated as 64,000 in 1981 and 162,000 in 1991 (Eade, Vamplew, and Peach, 1996). Many Bangladeshis initially took up factory work in

[4] Sailors from South Asia and the Arab world, employed on European ships

London and, to a lesser extent in northern towns, but as that work declined in availability, the catering industry received greater emphasis (Gardner, 1993).

Inner London has been the main focus of the Bangladeshi community, with a particular emphasis on the Borough of Tower Hamlets, a traditional immigrant settlement area associated with relatively low economic status and public sector (rented) housing (Eade, Vamplew, and Peach, 1996). The relatively late family reunion (compared with other Indian sub-continent groups) has been seen as a cause of delayed investment in property (home ownership) by Bangladeshis in Britain (Gardner, 1993).

Chinese

Chan and Chan, writing in 1997, concluded that

> the Chinese community in Britain has been long established and most immigrants have come mainly from Hong Kong through the strong connection established between Britain and Hong Kong in the nineteenth century following the defeat of the Chinese by the British in the Opium War of 1840.
>
> (Chan and Chan, 1997, p123)

Since then, Chinese immigrants to Britain have arrived from a much wider range of origins (Luk, 2009).

According to Luk, three waves of Chinese movement can be discerned since the 1850s, with the first wave occurring in the second half of the nineteenth century. These first arrivals were contract labourers from Guangdong province, and seafarers on the Shanghai to Liverpool line. In the early years of the twentieth century there were around 1000 Chinese in each of Liverpool and London (and few anywhere else) (Luk, 2008). Most of the pre-World War II arrivals intended to work for a number of years in the UK and then return home, and many did. Many arriving after the war had similar plans, but, increasingly, they became permanent residents.

The scale of ethnic Chinese growth in Britain has been recent and rapid with the population rising from just over 12,000 in 1951 to nearly 250,000 in 2001 (Luk, 2009). In the first decades after the Second World War, the majority of arrivals were ‘farming clans from villages in the New Territories of Hong Kong’ (Luk, 2008, p49), in part through ‘the collapse of the rural rice economy in Hong Kong and the influx of refugees from Communist China’ (Luk, 2009, p576). This second wave of immigration resulted in a much wider distribution of Chinese migrants throughout

the country and a high level of participation in the catering industry. In the 1970s the majority of immigrants were dependents of those already here, reuniting families but also improving the viability of family-run restaurants (Luk, 2008).

The 1980s onwards has seen the third wave of Chinese immigration to Britain. Unlike the second wave, in which a majority of Chinese immigrants came from rural Hong Kong, the current flow of immigration has been dominated by multiple origins: Chinese from Mainland China, Hong Kong, Taiwan, Vietnam, Malaysia, Singapore, and other South-East Asian countries (Luk, 2009). This migration was by far the largest with the Chinese population increasing by around 150,000 in the last 20 years of the twentieth century (Luk, 2008). This increase came despite more restrictive limits on immigration and, since 1990, the majority of new arrivals have been well-educated and highly-skilled specialists. The pattern of movement has also been influenced by the political and economic situation in the Far East – in China there has been a 'shift towards more liberal emigration policies' (Luk, 2009, p577) and 'in Hong Kong and many of the South-East Asian countries, emigration is a response to perceived political and social instability' (ibid).

At any one time there are now more than half a million Chinese students studying abroad, and Britain is the second largest recipient (following the USA). Over one-fifth of international students in Britain are Chinese, and China is the largest source of non-EU students (Luk, 2008). Chinese students from non UK-based families are thus a significant element of the Chinese population of Britain. Luk notes that the 'majority of students do not return home after the completion of their studies but take up employment in Britain or move to another European country' (op cit, p64).

Sikhs

Sikhism was developed as a monotheistic religious ideology in fifteenth-century Punjab. It is based upon the teachings of the first Sikh Guru, Guru Nanak Dev, and was further developed by ten successive Gurus. After the death of the tenth Guru, the guruship was invested in the Sikh religious text, the Guru Granth Sahib (Jaspal, 2013).

Links between the Sikh community in the Punjab and Britain began as a result of the British conquest of the Punjab in the mid-nineteenth century. The annexation of the Punjab by the East India Company in 1849 led to the exile of the

last Sikh Maharaja of Lahore, Duleep Singh and his arrival in London in 1854. This is the earliest record of a Sikh in Britain (Singh and Tatla, 2006). During the Victorian period, a number of other Sikh princes visited Britain. However, they were not the source of the twentieth century presence of Sikhs here.

'During colonial rule in India, Sikhs became the ideal subaltern community, their loyalty rewarded by mass recruitment into the Indian Army and recognition as the 'favoured sons of the Empire'' (Singh and Tatla, 2006, p3). It was through the military connection that Sikhs arrived in London. Initially, they were frequently brought to Britain as part of a number of major celebrations of the Victorian era, and over 100,000 Sikhs served in Europe during the first world war (though few actually reached Britain) (Singh and Tatla, 2006).

Small numbers did settle in Britain during the early part of the twentieth century; indeed many wealthy Punjabi Sikhs sent their children to Britain for education. Small numbers of Sikhs were living in Glasgow, Wales, and Northern England in the 1920s and 30s, and later in Manchester, Birmingham and Peterborough. However, it is only since 1945 that the Sikh population of Britain has grown from fewer than 2000 to over 300,000 at the end of the twentieth century (Singh and Tatla, 2006), initially through 'immigrants who came directly to Britain from Punjab or via East Africa' (Sato, 2012, p3).

Sikh immigration followed the general pattern of movement from the Indian sub-continent to the UK. Starting with upheaval and displacement during the partitioning of India in 1947, but with much increased momentum in the early 1950s through demand for labour in the industrial towns of Midland and northern England. This early immigration was mainly of young unmarried men who would have intended to return home after a few years. After 1962, legislation limited further immigration to dependents of those already here. However, Sikhs resident in East Africa (who were not covered by this legislation) arrived in the mid-sixties and early seventies following 'Africanisation' polices adopted in a number of countries (Singh and Tatla, 2006).

By the end of the 1970s the main period of immigration was over, such that at the start of the twenty-first century, 'British Sikh settlement in Britain has resulted in first, second and even third generations of British-born Sikhs' (Jaspal, 2013, p225).

3.4 Discussion and conclusions

The size, distribution and nature of the Jewish population of Britain, at the end of the twentieth century, has arisen through a complex combination of events and factors stretching back over centuries. The history shows that Jews were not indigenous to the British Isles, and thus international migration has been a very important element of population change in explaining the current level of Jewish presence in Britain. The most notable international migration event affecting Anglo-Jewry was the arrival of largely impoverished Jews, starting early in the nineteenth century, but rising to a high level during the 1880 to 1914 period; indeed the vast majority of today's British born Anglo-Jewry are descendants of arrivals from that period (Alderman, 1998).

Boyle, Robinson, and Halfacree (1998) have summarised the principal underlying elements behind migration as cultural, psychological, economic, political, and spatial, influenced by a wide range of circumstances in both the originating ('push' factors) and receiving locations ('pull' factors). The motivations that led to the level of Jewish migration from Eastern Europe to Britain (and of course to the larger numbers heading across the Atlantic Ocean) include a number of 'push' factors encouraging emigration from the east; the economic factors were clearly strong, but there were other issues relating to persecution and civil/religious rights, and a desire to avoid military conscription (Endelman, 2002). Certainly, as regards the 'pull' influences in Britain, the ability to rely for assistance and guidance from forerunners from the home town on arriving in Britain had a strong influence on place of settlement on arrival and probably on the decision to migrate in the first place (Endelman, 2002).

A broadly similar summary could be presented for each of the other groups mentioned above (Arabs, Bangladeshis, Chinese, and Sikhs) and which are included in the analysis presented in Chapters 6 to 8. The balance of influences may differ (military conscription is perhaps not relevant, but many Sikhs in East Africa faced similar issues of persecution or expulsion as Jews had in the Russian Empire). Certainly, the 'pull' influences were broadly similar; only the timing of these pressures was distinctly different for Jews than for the later arrivals. (The distinctively different Jewish population profile over time compared with the other groups is discussed in Chapter 6).

Post-immigration, Anglo-Jewry has undergone significant internal migration. Such movements can be simplified as regards the period from 1880 onwards as:

- gradual moves from London's East End to surrounding suburbs, and subsequently to areas of north-west and north-east Greater London, and more recently to areas of the adjoining counties of Hertfordshire and Essex;
- equivalent moves in all the major provincial communities from city centre or edge of city centre localities to the suburbs and (in some cases) to the rural fringe beyond; and
- an abandonment of port and smaller industrial towns.

The technical chapters of the thesis examine whether there is a continuation of these patterns into the twenty-first century, what the drivers for such change are, and whether the Jewish experience is acting as a template for any of the more recently arrived groups.

All the demographic researchers who produced analyses of Anglo-Jewry during the twentieth century bemoaned the absence of the comprehensive information that the inclusion of a religion question in the national census would have provided. However, it is also clear that through careful use of such data sources that could be identified much useful analysis has been carried out. One of the tasks of the current research therefore is to demonstrate that the step-change in the quantity of high quality information now made available by the 2001 and 2011 censuses is reflected in the sophistication and depth of analysis put forward in the remaining chapters of the thesis.

4. Over-arching issues

4.1 Overview

The aims of the research described in this thesis have been set out in Chapter 1. That chapter has also provided an overview of the content of Chapters 5 to 9 within which the technical work undertaken to meet these aims will be presented. The principal data sources available to undertake the research have been described in Chapter 2, and the background context featured in Chapter 3. The scene has thus been set for undertaking the investigative and analytical work which underpins the research presented in this document.

Table 4.1 provides a useful summary of the subject areas that are addressed in each of the technical chapters. It also indicates the main analytical techniques that have been applied, together with the particular elements of census output that have been utilised. Whilst each of the papers forming the basis of Chapters 5 to 9 includes a section that sets out background theory or describes other work relevant to its subject area, these sections are, of necessity, brief. There are, however, a number of matters, which are of relevance more broadly across this thesis, that are not sufficiently addressed in the later chapters. The purpose of this chapter is to provide a deeper understanding of those matters.

The key element of the research aims of this thesis is spatial distribution of minority groups and how this changes over time. The background theory to this topic is thus the focus of the first of the subsequent sections of this chapter. As can be seen from Table 4.1, it is an issue which forms the foundation to the work presented in Chapters 5 and 6. An adjunct to any discussion or analysis of spatial distribution are the methods used to provide quantitative measures of spatial distribution patterns and the degree to which population sub-groups congregate or are dispersed amongst other groups. The next section of this chapter (4.3) therefore provides the background to, and history of, the development of measures of population distribution and, in particular, the Index of Dissimilarity, *D*. That index is of direct relevance to Chapter 6.

Of the drivers of change in spatial distribution, internal migration is the one considered in most detail in the thesis. As Table 4.1 indicates, it is the focus of both Chapters 7 and 8. Only limited space was available in the papers which form the basis of those chapters for discussion of the underlying theories and mechanisms of

Table 4.1 Summary of study technical approach

Thesis section	Topic or investigation area	Technique or approach applied	Principal data source
Chapter 5	spatial clustering and heterogeneity of socio-economic and demographic characteristics	geodemographic assessment	2011 census standard tables at MSOA and LSOA level
Chapter 6	spatial distribution and distribution change trajectory, comparing Jews with other groups	Index of Dissimilarity, *D*	2001 and 2011 census population tables at LA, MSOA, LSOA, and OA level
		geographic heterogeneity of socio-economic characteristics	2001 and 2011 census standard tables at LSOA level
Chapter 7	the determinants of internal migration, comparing Jews with other groups	multivariate logistic regression	2011 census safeguarded individual microdata
Chapter 8	geographic patterns of internal migration, comparing Jews with other groups	spatial interaction modelling	2011 census SMS files at LA level with 2011 census standard tables at LA level
		multi-nomial logistic regression	2011 census SMS files at LA level with 2011 safeguarded individual microdata (applied at regional level)
		patterns of movement	2011 SMS files at LA level; ONS LS 1971-2011 address data at (2011) LA level
Chapter 9	recent trends in demographic and socio-economic change, and development of a population projection	geodemographic assessment	2001 census standard tables at ward, MSOA, and LSOA level
		class trend-based population projection	2001 and 2011 census standard tables, agglomerated by geodemographic class

migration. Section 4.4 of this chapter therefore provides the theoretical underpinning for that part of the thesis by providing a review of both international and internal migration.

In order to apply the theories relevant to the research, knowledge of various analytical techniques is also necessary. A number of those techniques are listed in Table 4.1; for example: various forms of logistic regression, spatial interaction

modelling, and geodemographic assessment. The majority of techniques used are introduced in sufficient detail within the technical chapters. Some, such as spatial interaction modelling and multi-nomial logistic regression have been applied in particular ways, and this has also been described within, in this case, Chapter 8. However the use of geodemographic assessment has been extended into new areas (unevenly distributed small sub populations), and the detail of the technique has been developed to overcome some weaknesses inherent in its application. The novel aspects are fully described in Chapters 5 and 9. However, to fully appreciate those aspects a more thorough explanation of classification techniques and particularly cluster analysis, which underpins geodemographic assessment, would be useful. Cluster analysis is thus the focus of the final technical section of this chapter, section 4.5.

4.2 Theories of spatial distribution and dispersal

The study of the spatial distribution of minority groups stretches back over many decades (see, for example, Jahn, Schmid, and Shrag, 1947; Duncan and Duncan, 1955). Park (1926) and others in the Chicago School discussed the linkage between place of residence and progress in educational attainment, employment, and income. Conversely, early work carried out on the issue of assimilation paid limited attention to the locational element, with Gordon proposing that marital assimilation, which he defined as 'large scale intermarriage' (1964, p71), would indicate an advanced level of cultural and behavioural assimilation. In the 1980s Massey noted that 'recent theory and research have overlooked spatial aspects of assimilation and stratification' (Massey and Mullen, 1984, p836) and he set out to develop a theory of ethnic residential segregation. A major element of that theory was a model of spatial assimilation within which Massey hypothesised that 'spatial assimilation is a direct function of acculturation … [and] of socioeconomic mobility' (Massey, 1985, p321); the impact of these factors would be influenced by the state of the housing market, the nature of the housing stock, the state of the urban economy, and the history and scale of immigration. With colleagues, he set out to quantify some of these relationships (Massey and Blakeslee, 1983; Massey and Mullan, 1984; Massey and Bitterman, 1985). The approach adopted used various data derived from the US censuses at both aggregate and individual level to devise relationships that linked length/level of education, occupational category, and income levels for a range of

minority groups to the level of propinquity between those groups and with the white Anglo-European majority. That work was extended by others (for example, Allan and Turner, 1996; Fong and Wilkes, 1999).

Although Massey evaluated his theories through a wide ranging review of investigations carried out in the United States, Canada, Australia, Great Britain, Western Europe and Israel, he did note (writing in 1985) that 'Britain is very different from other countries we have considered' (Massey, 1985, p332).

The influence of the nature of the British housing market, British styles of housing tenure, institutional attitudes to the allocation of public housing, and the resultant impacts on residential distribution of minority groups have been considered extensively in the literature. Difficulties of access to public housing for (non-white) immigrants in the 1950s and 1960s through institutional/procedural hurdles led most minority groups to take up residence in the poorest quality privately-rented homes in less-desirable inner area locations (Burney, 1967). This issue was examined in great detail, using an area of Birmingham as its focus, in what is now generally regarded as a classic study, undertaken and reported on by Rex and Moore (1967) – but see Banton (2015) and Peach (1996b) for a critical view of Rex and Moore's approach. When public sector housing did become more readily available, minority groups tended to be allocated poorer quality accommodation in particular areas. Even when strenuous efforts were being made to put housing allocations onto an equitable footing, past practices and, later, a fear of incidents of racial harassment, frequently led to minority groups seeking accommodation in areas where their own group was already well-represented (Phillips, 1987). Housing market issues in Britain may thus have delayed the movement of migrant groups away from areas of original settlement compared with other countries, though 'today there is much greater diversity in housing experiences and outcomes' (Phillips and Harrison, 2010, p223).

The underlying assumption behind much spatial assimilation research has been summarised by Peach, as

> an implicit model which argues that groups start highly segregated in inner city locations and disperse over time. Parallel and related to this spatial pattern is the social process of assimilation. Groups start highly

> segregated and unassimilated and become dispersed and assimilated over time.
>
> (Peach, 1996b, p379)[5]

However, Alba et al (1999) noted an increasing tendency for recent immigrants of higher socio-economic status to locate directly in suburban areas (rather than inner city locations) but anticipated that dispersion would follow.

In the last twenty years, assimilation theory in general and, as a consequence, the spatial distribution element also, has been much criticised. In part, this arises from misinterpretation. For example, Waterman and Kosmin expressed the view that spatial assimilation theory anticipated that 'immigrant groups entering a host society would disappear into it within generation or two' (1987, p254). However, as Nagel (2009, pp401-2) points out 'at no point did he [Gordon, 1964] argue that immigrant and minority groups simply melt into the mainstream over the course of a few generations to create a homogeneous society'. Somewhat provocatively, Greenman and Xie (2008, p109) boldly asked 'is assimilation theory dead?' However, they indicate that the question 'is only rhetorical; the answer depends on the interpretation of the theory' (op cit, p131).

In its basic form, assimilation theory can be criticised for an over-simplistic linear process of migrant adaptation into the host society (Nagel, 2009), and a number of researchers have sought to enhance the approach. Noting differences in attitude between second generation immigrants and their parents, Portes and Zhou (1993) developed the concept of 'segmented assimilation' through which a range of outcomes can be anticipated (see also Rumbaut, 2015; Xie and Greenman, 2005, 2011). Iceland and Nelson (2008) express this as 'multiple assimilation' based on a study of spatial patterns of Hispanics in the USA. Evidence from Canada indicates that although traditional assimilation theory explains historic trends in minority group spatial distribution, extensive new immigration has changed the balance of minority group distribution and reduced the influence of traditional theories (Feng, 2006). Similarly, South, Crowder, and Chavez (2005) found support for both traditional and segmented assimilation processes amongst US Latinos.

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[5] Peach is stating the traditional viewpoint; the context of the article indicates that it is not necessarily his view.

Wright, Ellis, and Parks (2005) have raised more fundamental objections to the spatial assimilation model. They point out that, socially and physically, most metropolitan areas have evolved such that the traditional inner city area surrounded by concentric rings of increasingly desirable suburbs (if it ever existed) has been replaced by polycentric conurbations with a diverse mix of residential locations. Nonetheless, they conclude that continuing dispersal is an active element in the spatial distribution of minority groups. Other writers have concluded that transnationalism, which stresses the importance of links between migrants and their countries of birth, provides a clearer understanding of migrant integration than does assimilation theory (see, for example, Erhkamp, 2005). Zelinsky and Lee have promoted a further spatial distribution concept – heterolocalism – in which 'recent populations of shared ethnic identity … enter a given area from distant sources, then promptly adopt a dispersed pattern of residential location, all the while maintaining strong social cohesion' (1998, p293).

More recent analysis of the spatial distribution of groups has given attention to the positive aspects of group concentration or congregation, such as producing a sense of well-being and identity (Peach, 1996b; Phillips, Cathy, and Ratcliffe, 2007; Erhkamp, 2005; Dunn, 1998). Group congregation can be conceived as a positive or negative concept: 'as a sign of community strength and strong bonding social capital (as in the case of Jewish minorities), as a mark of social exclusion (as in the case of visible ghettoised minorities), or as an indicator of self-segregation' (Bolt, Özüekren, and Phillips, 2010, p170). Andersen (2010) found evidence to support both traditional spatial assimilation theory and cultural preference theory (a desire to live with others of the same group) in a Danish context.

Some researchers have queried the strength of the link between socio-economic integration and residential location (Musterd, 2005, but see also Sager, 2012, for support for such a link), or that improving socio-economic prospects necessarily lead to residential moves from areas of settlement (Maloutas, 2004); indeed Bruch (2014) identifies between-group and within-group economic inequality, and relative group size as impacting on the spatial distribution of groups. Others have argued that housing market barriers for some groups continue to impede residential mobility (van Kempen and Özüekren, 1998; Crowder, Pais, and South, 2012); the latter authors finding that place stratification theory (in which certain

groups maintain their physical separation from groups they view as undesirable) more frequently fits USA observations than does conventional assimilation theory (Pais, South, and Crowder, 2012).

The overall understanding of spatial dispersion patterns of groups is possibly best summed up by Bolt, Özüekren, and Phillips (2010, p 182): 'Migrants' experiences do not conform to a simple model of social and spatial assimilation but are likely to be shaped by a range of cross-cutting factors.'

Spatial distribution is a thread that runs through the entirety of this thesis and acts as the principal over-arching element linking the various chapters of the document. Chapter 6 has spatial distribution as its focus (and includes a brief synopsis of the above text). The analysis presented in that chapter draws on a number of elements of spatial distribution theory reported on here. In particular it examines the relationship between population distribution and length of presence in the country, socio-economic standing and progress, and inter-marriage.

4.3 Measuring congregation and dispersal

The spatial distribution of the place of residence of various population groups has been the subject of research for a considerable period; see, for example, the qualitative work of Wirth (1927; 1928, republished 1998) on the Jewish population of Chicago, or the rather more analytical approach of Wright (1937). The desire to be able to describe the complexity of such distributions has led to the development of a plethora of measurement indices, with various researchers developing new formulations or proposing modifications to existing measures in order to overcome their weaknesses, or broaden their scope; for some pioneering work in this field see Jahn, Schmid and Shrag (1947). As long ago as 1955, Duncan and Duncan sought to bring some order to the situation in a wide-ranging review of indices with some degree of success (Duncan and Duncan, 1955). Thirty years later, Massey and Denton referred to the 20 year period post-1955 as the 'Pax Duncana' (Massey and Denton, 1988, p281). Massey and Denton's paper of 1988 identified twenty algorithms that had been proposed by that date and, bringing a more mathematically robust analysis to bear, sought to identify those of greater or lesser value to the area of research. Prior to examining the various measures, Massey and Denton theorised that there were 'five distinct axes of measurement [of residential distribution]: evenness, exposure, concentration, centralisation, and clustering' (ibid).

In order to assess to what extent a combination of measures would be necessary to more fully describe the spatial pattern, Massey and Denton carried out a factor analysis of the application of the measures to the data. They determined that the first two factors (broadly associated with evenness and exposure) explained the majority of variation between the areas under examination. They concluded that all five identified characteristics are important in quantifying spatial distribution. However, an alternative conclusion might be that measures of evenness and exposure explain so much of the variation that the additional information provided by adding a further three measures is not warranted (unless they are directly relevant to the focus of the particular research). Indeed, Massey and Denton themselves stated that 'evenness and exposure are two equally important, independent dimensions of residential segregation each explaining about 36 per cent of the variance' (Massey and Denton, 1988, p305).

The final part of Massey and Denton's paper made recommendations as to which of the twenty measures examined should be used. They indicated that 'the choice of an evenness measure is simple' (op cit, p308), and recommend the use of the Index of Dissimilarity (D) [6] on the basis of continuity in research literature and

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[6] Note that the Index of Dissimilarity for group g is defined as follows:

$$D_g = \frac{1}{2}\sum_{j=1}^{n} \left| \left({}^{g_j}/_{G}\right) - \left({}^{t_j^-}/_{T^-}\right) \right|$$

The Index of Isolation for group g as:

$$P_g^* = \sum_{j=1}^{n} \left({}^{g_j}/_{G}\right)\left({}^{g_j}/_{t_j}\right)$$

The Location Quotient for group g in sub-area j as:

$$LQ_{g_j} = \left({}^{g_j}/_{t_j} \div {}^{G}/_{T}\right)$$

where n is the number of census areas in the study area; g_j is the population of group g in census area j; G is the population of group g in the study area; t_j is the total population of census area j; T is the study area total population. The Index of Dissimilarity may be used to assess the unevenness of a group compared with the population as a whole, in which case $t^- = t\text{-}g$, and $T^- = T\text{-}G$; or to compare two groups, in which case $t^- = h_j$ (the population of the second group in area j) and $T^- = H$ (the population of the second group in the study area) (Simpson, 2007).

simplicity of calculation and understanding. They recommend the Index of Isolation (or the complementary Index of Interaction) as the measure of exposure. A later update to the analysis endorsed the continuing use of the Index of Dissimilarity and Index of Isolation/Interaction (Massey, White, and Phua, 1996).

Massey and colleagues' work utilised only American data, and many researchers have drawn a distinction between the type of spatial distribution seen in the USA with that found in the UK and Europe (see, for example, Peach, 1996b). Simpson's (2007) work is based on the UK experience and is much more recent than the previous reviews. His preferred measures were the Index of Dissimilarity and the Index of Isolation and, to measure diversity, he recommended the use of the Reciprocal Diversity Index – a measure 'borrowed' from the field of ecology, where it has been used to assess 'how close a set of species are to equal numbers within an area.' (op cit, p410).

Simpson recognised that one of the strengths of the Index of Dissimilarity and the Index of Isolation is that they are widely recognised and easily interpreted:

> The proportion of a group that would have to move to be distributed through localities like the rest of the population (the Index of Dissimilarity) and the average proportion of a group across all localities (the Index of Isolation) can be usefully employed to describe respectively the evenness and the exposure of each ethnic group.
>
> (Simpson, 2007, p421)

Brown and Chung (2006) provided an alternative perspective in their reconsideration of Massey and Denton's work. Their paper discusses the use of the Location Quotient – a concept that has been used extensively in economics for several decades, but has had limited exposure in population studies; and Local Moran's *I*, or spatial autocorrelation coefficient – an extension of a statistical technique first presented by Patrick Moran in 1950 (see Moran, 1950). The Location Quotient is an elementary concept, simply comparing a group's proportion of the population in an analysis area with its proportion over the study area as a whole. Local Moran's *I* is a more complex calculation, needing more information on spatial relationships, to allow a 'weight' to be attached to each analysis area depending on the characteristics of the surrounding analysis areas. It is able to identify major clusters of a minority group and 'ignore' individual anomalies in the data.

D (the Index of Dissimilarity) is the front runner in terms of frequency of use in publications. That is not to say that it is without weaknesses. Its value is influenced by the spatial units of the data (smaller units tend to increase homogeneity of population and thus lead to increased values of the index), so care has to be taken in its use, particularly if comparisons are being made between localities subject to differing data and areal definitions or between time periods.

These and other perceived weaknesses have led some researchers to identify alternative non-formulaic/parametric analysis tools to measure spatial distribution, or a graphical representation of the concentration or distribution of a population group. Examples of such approaches include

- classification of areas based on the proportion of the population that is from the dominant group, and the proportion from the largest non-dominant group, area by area (see Poulsen, Johnston, and Forrest, 2001; Johnston, Poulsen, and Forrest, 2007, 2010);
- Brimicombe's (2007) more statistically rigorous variant on this; and
- the use of variograms (see Lloyd 2010, 2015).

None of these recent attempts to encapsulate the spatial distribution of groups has been taken up by many other researchers.

Certain weaknesses in the Index of Dissimilarity were raised as long ago as 1955 (Duncan and Duncan, 1955), and expanded on by Cortese, Falk, and Cohen (1976), leading to a heated exchange of comments between Taeuber and Taeuber (1976) and Cohen, Falk, and Cortese (1976). A further exchange took place between Winship (1977, 1978) and Falk, Cortese, and Cohen (1978). These primarily centred on the following points:

- Whether the 'non-segregated' scenario should be based on a precisely even distribution of a minority group within the majority, or whether the base position should be a random distribution of one within the other.
- The integer nature of the data means that the minimum value of the Index is often greater than zero (and maximum value less than unity).
- The size of the minority group can impact on the value of D for apparently similar levels of segregation.
- The size of areal units used in the census or study will affect the value of the Index.

- Whether the concept that the Index is equal to the proportion of the minority that would need to relocate to give an even distribution should be replaced with the idea of exchange rather than relocation of members of only one group.
- Certain patterns of exchange have no impact on *D*, whereas some other patterns produce counter-intuitive changes in the value of *D*.
- Whether comparison between localities might benefit from standardised *Z* values of *D* (based on standard deviations about the mean) rather than relying on raw scores.

The participants in these discussions have taken quite different viewpoints as to the scale and/or relevance of any of these factors in 'real life' analyses rather than theoretical considerations.

The specific issues of random variation and small group populations have been resolved through the intervention of Voas and Williamson (2000), who proposed a method by which the raw results of the Index of Dissimilarity could be corrected to address these matters. Notwithstanding this work and the possible weaknesses mentioned above, the majority of papers continue to quote unadjusted values of the index, irrespective of the scope of investigations, without significant challenge from other practitioners. So, the conclusion of this review is that the Index of Dissimilarity is now so well established and ingrained in the spatial distribution research and literature that, notwithstanding some limited theoretical issues associated with it, it is the primary measure of evenness of distribution.

This extensive discussion on methods of measuring spatial distribution acts as a backdrop to some of the matters raised in Chapter 6, part of which focuses on issues surrounding the use of the Index of Dissimilarity, the impact of geographic scale, and the extent to which use of an index is adequate to allow the spatial distribution of groups to be understood, explained, and compared.

4.4 Theories of migration

International migration

Such is the complexity of the psychological and/or deterministic processes which underlie migratory decisions that a whole range of theories of migration have been developed over the last century (Massey et al, 1993).

Boyle, Robinson, and Halfacree (1998) list the main components that underpin migration and also identify that some of the theories that have been developed are based on how these underlying components act on individuals, whereas other theories recognise the wider influence of families, communities and society at large. Some theories are deterministic – they assume that a particular set of circumstances will result in a determinable migration effect. Others recognise that a wide range of other circumstances in both the originating ('push' factors) and possible receiving locations ('pull' factors), and for potential migrants and their families and communities (the 'humanist' element), will result in a range of migration outcomes.

The numerous international migration theories that have been developed have been summarised by Castles and Miller (2009). They group theories as –

- neo-classical, in which individuals maximise their economic utility (see for example Borjas, 1989)
- dual or segmented labour market theory, which introduces institutional factors to the economic process – (see, for example, Piore, 1979; Portes and Bach, 1985)
- new economics of labour migration which take account of the wider influence of families and communities in migration decisions (see Taylor, 1987; and Stark, 1991)
- historical-institutional approaches – mobilising cheap labour for capital, allegedly making rich nations richer and poor nations poorer (see Cohen, 1987; Sassen, 1998), leading to
- world systems theories (see Main, 1974; Wallerstein, 1984).

Internal migration

Whilst the driving forces behind internal migration may be broadly similar to international migration, does the absence of an international element make internal migration (particularly in the UK) easier to theorise? Fielding's conclusion is that 'internal migration processes (though often failing to conform to existing conventional theories) are both fairly straightforward and easily understood' (2012, p98).

Molho's 1986 review of theories of migration does not, strictly, confine itself to internal migration; it is, nevertheless, a good starting point for its consideration.

The strength of that review is demonstrated by it being deemed worthy of republication in 2013 (see Gordon, 2013). Molho notes seven key elements that need to be considered (Molho, 2013, pp527-528), abridged as follows:

1. Sub-optimality in migration decision making due to imperfect information.
2. The need to distinguish between 'speculative migration' and migration to fulfil a secured opportunity.
3. The spatial element in terms of the distribution of opportunities, costs related to movement, and acquisition of information.
4. The relationship between the number and type of opportunities for movement and individual preferences and sets of constraints.
5. The underlying motivation for moving, including the interaction between labour market and housing market related moves.
6. The time spans involved in migration decision making and enaction.
7. The relationship between individual behaviour and aggregate patterns of movement.

Millington (2000) builds on Molho's foundation, homing in on 'the various forces stimulating migration (the so-called 'push and pull' effects operating at origin and destination respectively)' (p522), and noting that 'the spatial pattern of job vacancies may be the single most important complement to local unemployment rates in explaining British interregional migration flows' (ibid). He also suggests that 'site-specific amenities (e.g. climate) may be important in shaping migration flows' (p523).

In parallel with the development of theories that attempt to understand the underlying causes of migration, much research has been undertaken in attempting to describe migratory patterns, frequently with a view to developing migration models. Despite the 130 years that have elapsed since he first put them forward, Ravenstein's (1885) 'laws' of migration are still frequently referred to, and they underpin much of the twentieth century investigations in this area. Certainly King (2012), reviewing the contribution of geographers in studying migration, mentions Ravenstein as one of four key players.

There is a significant body of research focusing on internal migration in the USA. Greenwood (1985) sought to identify the underlying drivers of internal migration in the USA. He concluded that

> A number of life-cycle considerations – such as marriage, divorce, completion of schooling, entry into the labour force, start of a career, birth and aging of children, and retirement – are critical in an individual's or family's decision to migrate. Other personal circumstances include employment status, earnings, education, accumulated skills, age, sex, and health.
>
> (Greenwood, 1985, p527)

In bringing Greenwood's research up to date, Molloy, Smith, and Wozniak (2011) concluded that there had been a steady and consistent decline in the level of internal migration in the US from a peak around 1980, the reasons for which the authors describe as 'elusive' (p173), through various cycles of the economy and housing market though, in general, internal migration rates in the US remain higher than in most European countries.

In a study to assist the UK government formulate housing policy, Champion et al (1998) carried out some key work on identifying the determinants of internal migration, building on the foundations laid down by Champion and Fielding (1992), and Stillwell, Rees, and Boden (1992). The 1998 report includes a number of key conclusions – many of which echo those identified by Greenwood in the US context:

> The migration of young adults is affected by the distribution of places in higher education and first jobs in the labour market. The migration of families is driven by labour market factors and environmental factors influencing the type of area of destination choice. The migration of the retirement age group is conditioned by the state of the housing market and by environmental factors (pushing them out of large cities and pulling them into smaller places). The migration of the elderly is influenced by the provision of support and care based on the family, community and/or the state. Migration activity also differs according to social and cultural attributes, notably people's employment status, occupation and ethnicity.
>
> (Champion et al, 1998, p viii)

They see labour market factors being key to longer-distance moves, as well as the impact of the UK mix of housing tenures (owner occupation, public/social housing, and the private rented sector all having their own influences on migration propensity); the role of environmental factors is also discussed.

A more recent analysis of the underlying drivers behind internal migration in the UK is provided by Fielding (2012). He places emphasis on the economic drivers, suggesting that some of the complexity in the relationship between

economics and migration arises through three complementary elements each operating with quite different time frames: 'short term business cycle processes; medium term restructuring processes; and long-term deep structural processes' (Fielding, 2012, p127). He places less importance on social, demographic and political drivers, but notes the importance of the individual's life course, with least importance attributed to environmental drivers. The importance of life course perspectives to the understanding of internal migration is emphasised by Tyrrell and Kraftl; indeed they note that 'life-stage studies remain the bedrock for much research at the intersection of the lifecourse and UK internal migration' (2015, p29). The authors describe the different influences on people at differing stages of their lives, leading to major change in the propensity to migrate. These result in migration out of the parental home, migration for employment, and migration for cohabitation in young adults, family migration for parents and children, retirement migration associated with grandparenthood or widowhood, and geriatric dependency leading to migration to care homes.

Conclusions from the literature

It is clear that the underlying considerations that lead people to move their place of residence are complex; it is also clear that life-course changes have a major bearing on the need and timing of residential moves. In addition, consideration of the possibility of moving is strongly linked to economics – both at a personal/household level (employment opportunities) and the wider state of the national/regional economy. Linked to economics are aspirations for improved housing tenure or quality, educational opportunities (with a focus on younger members of the household), and an element of consideration of the environment.

The overall impact of these considerations is that migration levels are highest for young adults, with a significant peak associated with leaving the parental home as part of attending/leaving college, and new household/family formation. In terms of empirical modelling of migration levels, there is thus a clear and strong relationship between age and likelihood of moving home, notwithstanding that age is not itself the determining factor – it is a proxy for the timing of life-course events. Gender has relatively little impact. Indeed, apart from age, key characteristics that studies have found to explain varying levels of migration are: employment status; home tenure; family structure / presence of dependent children; educational qualifications;

socio-economic status; and student status. Studies examining ethnic groups have found differences in levels of migration between groups (Finney and Simpson, 2008). Whilst many of these differences have been explained by differences in socio-economic characteristics, the studies have found residual differences between the groups that are not otherwise explained. Potentially there might be intrinsic differences for a religion-based group (such as Jews) compared with other religions or the population as a whole.

Internal migration is an important influence on spatial distribution, and the background that has been described above sets the scene for the work on determinants of internal migration for small groups undertaken in Chapter 7, and the geographic patterns associated with migration which are the focus of Chapter 8.

4.5 Classification techniques and geodemographics

Introduction

The need to understand whether observations are randomly spread or whether they group into 'clusters' is a concept that is of importance across a wide range of biological, medical, and social sciences, and many of the clustering techniques have been developed in various specialist fields in parallel (Lorr, 1983). These techniques consider N entities or cases, for each of which k characteristics or variables have been identified, and attempt to subdivide the N entities into a number of sub-groups within which there is a measure of homogeneity of characteristics.

In most studies in which cluster analysis is undertaken, the cases being examined are individual entities or species and there is a need to understand whether these form distinct clusters or are randomly spread. In this study, the 'cases' are agglomerations of data, pooling all the information about Jewish residents within an area. The process will allocate the Jewish population of an area to a particular cluster or sub-group, so that the spatial distribution of Jewish populations that share characteristics can be understood. The technique underpins the work that is described in Chapter 5 of this thesis, and is returned to in Chapter 9. It thus provides the foundation for addressing the research aims of understanding the extent of heterogeneity in Anglo-Jewry and where groups (whether similar or different to each other) are to be found.

Cluster analysis of population-based data *per se* will identify cases or aggregated data based on geographic units that share various characteristics; geodemographic mapping determines whether there is any locational relationship between similarly classified areas. Harris (2003, p225) defines geodemographics as 'the analysis of socio-economic and behavioural data about people, to investigate the geographical patterns that structure and are structured by the forms and functions of settlements'.

Prior to consideration of the locational element of geodemographics, it is important to understand the underlying cluster analysis techniques used in this field. The review provided in this section is drawn principally from Lorr (1983), Everitt et al (2011), and Harris, Sleight, and Webber (2005). The overall process undertaken in clustering analysis consists of:

- Producing a representation of the *N* entities in *k*-dimensional space, usually with the data transformed or standardised in some way so that each variable is placed on an equal footing in the assessment.
- Determining an appropriate rule to measure the similarity or dissimilarity between each of the entities, frequently expressed as a 'distance' between the cases.
- Apply a method of clustering (which makes use of this rule) through which cases are grouped into clusters.

There are two principal groups of clustering techniques: hierarchical/multilevel, and single-level/optimising. Hierarchical techniques are usually agglomerative – the starting point is that each entity is regarded as a cluster (*N* clusters) and the clusters are progressively grouped together, reducing the number of clusters by one at each step until, at the final step, the last remaining two clusters are combined to form a single cluster. The process can be stopped at any point to produce a desired number of clusters, or a rule can be applied to identify an optimised stopping point. In most algorithms, once a case has been combined into a cluster that cluster cannot be broken up, but simply aggregated with other entities or clusters as the process proceeds. In some techniques the process is reversed – the starting point is a single total cluster that is progressively subdivided in an iterative process.

Single-level techniques generally commence by subdividing the totality of entities into a number of clusters (often selected by the user), either randomly or based on a starting rule, and then iteratively attempt to improve the clustering (based on a particular rule) by moving the boundaries between clusters, until further improvement cannot be achieved.

Individual techniques differ by the metric used to measure dissimilarity or distance between entities and between clusters; the rule for combining clusters in hierarchical techniques; and the rule for optimising the allocation of entities to clusters in single-level techniques. In the following section these alternative approaches are outlined and their strengths and weaknesses considered, in the context of classifying populations (see Lorr, 1983, and Everitt et al, 2011, for greater detail).

Measures of distance or dissimilarity between entities

When considering only two dimensions, the shortest distance between two points located at x_1y_1 and x_2y_2 is the length of the straight line that joins them. This line is the hypotenuse of a right angled triangle connecting x_1y_1 with x_2y_2 and x_2y_1.

This Pythagorean concept can be extended to *k* dimensional space, where the equivalent distance is called the Euclidian distance. Some methods do not take the square root of the calculation and thus use squared Euclidian distance. An alternative approach is the equivalent of summing the lengths of the other two sides of the right-angled triangle, rather than measuring the hypotenuse; this is known as city block, taxicab, or Manhattan distance as it is the distance that would need to be traversed by a vehicle in a town with a rectilinear street pattern. Both the Euclidian and Manhattan distances are partial cases of the Minkowski distance. The Euclidian distance is the square root of the sum of the squares of the individual variable differences; more generally, the Minkowski distance is the *r*th root of the sum of the individual variable distances raised to the power of *r* (where *r* is any positive integer); the Manhattan distance is produced by setting *r* to 1 (Deza and Deza, 2016).

The situation is more complex when the 'distance' between clusters or between clusters and individual entities has to be assessed, as part to the process of cluster formation. Four relatively straightforward measures are often used (though there are others). One considers the distance between an unclustered entity and the closest entity within the cluster with which it is being assessed (used in 'single

linkage' or 'nearest neighbour' techniques); another approach considers the distance to the furthest away entity within the cluster (used in 'complete linkage' or 'far neighbour' techniques); a third averages the distances between the lone entity and every individual case within the cluster ('group average linkage' or 'unweighted pair group method'), and the fourth considers the distance from the entity to a centroid position within the cluster ('centroid clustering' and 'median linkage' approaches).

Gower and Legendre (1986) provide a very detailed analysis of the mathematical properties of a very wide range of coefficients (distance or dissimilarity measures) that might be used in cluster analysis, together with a theoretical assessment of their suitability depending on the nature of variables and the inclusion or exclusion of negative values. They favour the Euclidian or squared Euclidian distance for continuous data that include negative values (which will occur if values have been standardised with a mean of zero). Everitt et al conclude that

> it would be extremely useful to know which particular measures are 'optimal' in some sense. Unfortunately, … the question cannot be answered in any absolute sense, and the choice of measure will be guided largely by the type of variables being used and the intuition of the investigator.
>
> (Everitt et al, 2011, p69)

Hierarchical clustering techniques

Hierarchical techniques vary in the rule used to determine which entity or cluster should be merged with which other entity or cluster to reduce the number of clusters, iteratively from N to N-1, and ultimately to 2 and then a single overall cluster – that is, whether single linkage/nearest neighbour, complete linkage/far neighbour, group average, centroid, or median approaches should be used. Everitt et al (2011, p79) provide a table summarising some of the issues associated with each of these approaches. They also describe a popular hierarchical technique known as Ward's method. Instead of using a 'distance' measure in an absolute way to determine which entities/clusters should be merged next, it identifies the combination that minimises the increase in total within-cluster variance after merging. The approach makes use of the squared Euclidian distance between cluster centres.

Hierarchical methods tend to be more transparent than optimisation methods, in that the stages of the clustering process are visible in the tree-like dendrogram that illustrates the sequence in which the entities have been grouped into clusters, and the

logic of each merge is usually tabulated. There is some evidence, however, of hierarchical methods having difficulty in coping with outliers in the data which can tend to remain as separate one-entity clusters until late in the process.

Everitt et al also consider how the number of clusters to be adopted should be determined (that is, at which point the tree-structure dendrogram should be 'cut'). However, although some suggested mathematical formulae for determining the optimum location are discussed, ultimately they conclude by quoting from Baxter (1994): 'informal and subjective criteria, based on subject expertise, are likely to remain the most common approach' (as cited in Everitt et al, 2011, p96).

Optimising techniques

In principle, the optimising techniques work by initially partitioning the N entities into g partitions, measuring the 'distance' between entities, and between entities and a focal point within each partition (where 'distance' could be any of the possibilities described earlier). An optimising rule associated with either a measure of homogeneity within each partition or a measure of separation between the partitions is then used to assess whether entities should be moved from one partition to another. Everitt et al (2011, pp113-116) provide a detailed discourse on various optimising criteria. A number of the algorithms described are associated with ensuring that non-spherical clusters are not sub-partitioned by the process – an aspect that is not relevant to this study.

The number of possible partitions of N entities into g groups is very large even for small numbers of cases and variables. Everitt et al (2011) indicate that a 10 case, 3 cluster problem has 9330 possible solutions – rising to over 10^{67} for a 100 case, 5 cluster situation. Clearly, it is impractical to test every possible option, and the major drawback of the optimisation techniques is the likelihood of reaching a local minimum, rather than the overall optimum solution. The techniques vary in the way that the initial partition is produced, and in the method of optimisation.

Two main approaches to optimisation have found favour (Everitt et al, 2011). The first approach is to minimise the sum of the within-group sums of squares, over all the variables; this is referred to as 'minimisation of trace' approach and is achieved through the minimising of the sum of the squared Euclidean distances between each entity in a partition and the partition mean. A second approach 'borrows' a test used in multivariate analysis of variance, where a test for differences

in group mean vectors is based on the ratio of the determinants of the total and within-group dispersion matrices; this is referred to as the 'minimising the determinant' approach. The first approach is by far the most commonly used, and forms the basis of the widely used '*k*-means' clustering algorithm.

Despite the popularity of *k*-means (and other optimisation) algorithms, they are recognised as having a major difficulty in avoiding local minima in their solutions and finding the genuinely optimum solution. The process can be far from transparent and the approach also requires the user to select the number of clusters or partitions to be devised at the outset. Although Everitt et al describe a number of possible guidelines on selection of number of clusters, they conclude that 'it is advisable not to depend on a single rule for selecting the number of groups but to synthesize the results of several techniques' (2011, p130). Harris, Sleight, and Webber (2005) recommend merging the two most similar clusters if the consequent loss of variance in the dataset falls below a threshold value.

Conclusion on techniques

The literature does not provide absolute guidance on the appropriateness of different clustering techniques, indeed Harris, Sleight, and Webber describe the overall process as 'a cross-breed between art and science!' (2005, p181). However, Everitt et al do provide a tabulation of their 'overview of data types and applicable clustering methods', in which, insofar as continuous data types are concerned, they note that 'Ward's method, average linkage, and k-means or methods based on det(W) are popular choices' (2011, p258). Indeed, an examination of published classifications using population census data indicates that Ward's method and *k*-means algorithm are the dominant techniques applied (Vickers and Rees, 2007; Gale et al, 2016). There is considerable merit in attempting to combine positive elements of both techniques – for example, using the hierarchical approach (with suitable modifications to address the issue of outliers) to produce some near optimal cluster centres as a better-than-random starting point for a *k*-means analysis, and using the *k*-means approach to rebalance peripheral members of a hierarchical cluster to the correct final cluster.

This discourse on clustering/geodemographic techniques and the conclusions reached form the basis on which the geodemographic assessment of the Jewish population of England and Wales has been implemented in Chapter 5 of the thesis.

This, in turn, underpins the extension of the concept to identify trends and produce a population projection as set out in Chapter 9.

4.6 Conclusions

Spatial distribution of small sub-populations within a host or dominant group and how this changes over time through internal migration (and other mechanisms) is of fundamental importance to the overall research presented in this thesis. Sections of this chapter have therefore presented a review of theory and literature in these areas, to provide context for the work that follows. Similarly, given the quantitative approach adopted in this research, it is essential that the history and complexity of expressing spatial distribution in numerical terms is understood; this has also been addressed in this chapter. Finally, such is the wealth of data available from the England and Wales census that techniques are needed to meaningfully present the spatial variation in the nature of the population under examination, without over-diluting the information available. Geodemographic assessment, which is underpinned by cluster analysis, is a highly useful approach that can achieve this; hence it too finds its place in this chapter.

These theories, issues, and techniques thus provide a foundation for the technical work set out in the chapters that follow, starting with the use of geodemographic analysis in Chapter 5. Other techniques, such as various forms of logistic regression and spatial interaction modelling, also feature at various points; these are either so widely used that they need no introduction, or are briefly introduced in the relevant chapters.

5. Beyond the strictly orthodox / mainstream divide: applying geodemographic analysis to a small nationwide sub-population

Thus far, the chapters of this thesis have set out the aims and purpose of the research, background information that sets the context, and described the key data sources and some over-arching matters relevant to the approach taken. Chapter 5 is the first of five chapters that constitute the technical 'heart' of the thesis, describing the analysis that has been undertaken and results obtained. The focus of this chapter is on establishing a clear picture of the Jewish population of England and Wales in the early part of the twenty-first century, through an analysis of the outputs of the 2011 census. The technique used for this is geodemographic assessment – cluster analysis with a spatial/geographic element, as introduced in the penultimate section of the previous chapter – an approach that has special challenges when applied to a small unevenly distributed sub-population. One of the challenges was finding a suitable geographic base for the analysis. In addressing that issue, the paper provides a detailed understanding of the current spatial distribution of Anglo-Jewry, one of the key aims of the thesis. The geodemographic assessment itself addresses another key point – identifying and understanding the characteristics of the Jewish population and in particular, whether distinctive variations in characteristics are present and, if so, whether there is a spatial element to the pattern of variation. This chapter thus provides the foundation on which the other technical chapters can build.

The text of this chapter is primarily as found in the published paper – 'Beyond the strictly orthodox/mainstream divide: Applying geodemographic analysis to a small nationwide sub-population' DOI: 10.1016/j.compenvurbsys.2015.11.004. The paper was submitted to 'Computers, Environment and Urban Systems' in July 2015, accepted and published on line in November 2015, and subsequently as pp36-47 of the March 2016 volume of the journal. A small amount of additional commentary on the final classification system (Figures 5.2, 5.3, Table 5.8, and the text that introduces them), omitted from the published paper for reasons of space but of relevance to the overall study, has been included in this chapter. Note that publications referred to in this (and the subsequent papers to be found in Chapters 6 to 9) are listed in the Bibliography/Reference List towards the end of the thesis, rather than within each paper.

Abstract

The use of geodemographic analysis has a long history, arguably stretching back to Charles Booth's *Descriptive Map of London's Poverty,* produced in 1886 and the published classification of areas has invariably been based on all residents. The work described in this paper, however, is novel in the use of geodemographic analysis to focus on a single minority group within a national census. This paper describes the development of a methodology that allows geodemographic analysis to be applied to unevenly distributed minority sub-populations, overcoming two particular issues: finding a suitable geographic base to ensure data reliability; and developing a methodology to avoid known weaknesses in certain clustering techniques, specifically distortion caused by outlier cases and generation of sub-optimal local minimum solutions. The approach, which includes a visual element to final classification selection, has then been applied to establish the degree to which the Jewish population in an area is similar in character to, or differs from, Jews living in other areas of England and Wales, using data from the 2011 census. That group has been selected because of the maturity of its presence in Britain – study of this group may point the way for examination of other, more recently arrived, sub-populations. Previous studies have generally assumed homogeneity amongst 'mainstream' Jews and have not considered spatial variation, separating out only strictly orthodox enclaves. This paper demonstrates that there are indeed distinct socio-economic and demographic differences between Jewish groups in different areas, not fully attributable to the underlying mainstream social geography, whilst also identifying a strong degree of spatial clustering; it also establishes the practicality of applying geodemographic analysis to minority groups.

5.1 Introduction

A range of techniques with the aim of subdividing a set of objects into a series of broadly homogenous sub-groups falls under the generic title of 'cluster analysis', sometimes referred to more formally as 'numerical taxonomy' (Lorr, 1983; Everitt et al, 2011). The addition of a spatial element to the analysis differentiates geodemographics from other forms of cluster analysis, and determines whether there is any locational relationship between similarly classified areas. Put perhaps too

simply, geodemographics is the 'analysis of people by where they live' (Sleight, 1997, p16).

Geodemographic analysis has an extended history (Batey and Brown, 1995; Singleton, 2004; Singleton and Spielman, 2014) and some geodemographic investigations have included a religion or ethnicity variable in studies of the whole population, such as the study on ethnicity and school choice in Birmingham (Harris, Johnston, and Burgess, 2007). However, the work described in this paper is unusual in the use geodemographic analysis to classify areas solely on the basis of the characteristics of a single minority group (Jews) within a national census.

So, what is the wider benefit of this research? As with any form of neighbourhood classification, the outputs can be used to identify the needs of the targeted group (for example, assessing future social and community requirements), and previous work in examining socio-economic/demographic issues for Jews in England and Wales has only been able to make use of geographically limited surveys (for example, Kosmin and Levy, 1981), or small sample national studies (Graham, Staetsky, and Boyd, 2014; also Kotler-Berkowitz, 2006, and Goldstein, 2013 for equivalent American experience). The approach adopted here could be applied to other sub-populations, so why select the Jewish group for this study? The majority of Jews in the UK have their roots in the major migration westwards from the Russian Empire that took place between 1880 and 1914; some chose the UK as their preferred destination, others had hoped or intended to continue on to the USA, but either could not face or afford the second stage of the journey (Endelman, 2002). During the first half of the twentieth century, Jews formed the only significant non-western-European and non-Christian minority group in Britain. Immigration from a range of world regions during the second half of the century now means that Britain is home to overseas and first and second generation UK-born citizens with a range of ethnic group and religious backgrounds (Simpson, 2012). However, the majority of Jews in Britain are now third to fifth generation UK born; so a study focused on this well-established group should provide pointers for other groups whose UK presence is less mature (Waterman and Kosmin, 1987).

Previous studies have identified concentrations of strictly orthodox Jews (Vulkan and Graham, 2008; Graham, 2013a in the UK; and Comenetz, 2006 in the USA) and have considered their socio-economic characteristics finding large family

sizes and high levels of deprivation (Holman and Holman, 2002; Valins, 2003). Other studies have given some limited attention to spatial variation in the characteristics of 'mainstream' Jews (Abramson, Graham, and Boyd, 2011; Becher et al, 2002; Graham, Staetsky, and Boyd, 2014); in most studies, however, this group, whose overall characteristics (as measured by the census) are not dissimilar to the wider UK population, tend to be considered as a homogenous group. This paper develops a methodology to overcome the challenges in applying geodemographic analysis to unevenly distributed minority groups, and applies that approach to establish the degree to which the Jewish population in one area is similar to or differs from Jews living in other areas.

5.2 Classification techniques and previous census analyses

The data on which clustering techniques are to be applied can usually be presented as an N row by k column matrix, where each row represents a case or entity, and each column represents one of the characteristics or variables of the cases. The background to and overall process undertaken in cluster analysis and geodemographics are now well established and do not need to be detailed here. Both Lorr (1983) and Everitt et al (2011) provide comprehensive overviews of the clustering concept; Harris, Sleight, and Webber (2005) provide a briefer synopsis. They note that there are two basic 'families' of clustering techniques: hierarchical (where cases are progressively grouped into clusters) and optimising techniques, which generally commence by subdividing the totality of entities into a number of clusters and then iteratively attempt to improve the clustering by moving the boundaries between clusters.

Analyses based on USA, UK, and other census data (usually in combination with other information) have been carried out by commercial organisations for use primarily as a tool to target marketing campaigns for private-sector organisations (Webber, 1985; Singleton and Spielman, 2014, Harris, Sleight, and Webber, 2005). Non-commercial analyses of UK census data have been carried out for, or in partnership with, the Office for National Statistics (ONS) from the 1981 census onwards. Local authority level analyses are described by Wallace and Denham (1996), and Vickers, Rees, and Birkin (2003); and analyses based on lower level geographies by Charlton, Openshaw, and Wymer (1985), Blake and Openshaw (1995), Vickers, Rees, and Birkin (2005), Cockings, Martin, and Harfoot (2015), and

Gale et al (2016). Despite extensive experimentation, in each case the final analyses were produced through the use of Ward's hierarchical approach, or the *k*-means algorithm, or various combinations of the two (see Lorr, 1983, and Everitt et al, 2011, for the detail of these techniques). A multi-level *k*-means assessment was adopted by ONS in carrying out a classification based on the 2011 census (ONS, 2014a).

5.3 Technical challenges

So, what lessons can be learned from previous work in this field? In terms of the techniques, hierarchical methods benefit from a greater transparency in the process and the sequential formation of clusters, but are 'sensitive to outliers' (Everitt et al, 2011, p79; see also Hubert, 1974). In addition, the movement of cluster centres that occurs as clusters are merged can mean that cases close to the periphery of a cluster might be located closer to the centre of a different later-stage cluster – as 'making the best decision at each particular step does not necessarily lead to an optimal overall result' (Harris, Sleight, and Webber, 2005, p162). Of the hierarchical techniques, Ward's algorithm is the most popular for assessing population census data.

Conversely, the *k*-means approach has the benefit of ensuring that the solution produced does locate every case in the cluster to which it is 'closest'. However, it is something of a 'black box' approach and is highly prone to produce local minimum solutions; as Everitt et al (2011) indicate, a 100 case, 5 cluster scheme has over 10^{67} possible solutions, and they cannot realistically all be tested. Steinley (2003, 2006) recommends running large *k*-means clustering analyses with at least 5000 different starting points in order to overcome the issue of local minima.

The approach adopted in this paper seeks to combine positive elements of both techniques. Whilst combined technique approaches have been used in earlier census-based classifications (Bailey et al, 2000; ONS, 2003), those assessments used the *k*-means technique solely to re-allocate Ward's algorithm cases to their nearest cluster centre. The approach adopted in the current paper is novel in combining two techniques specifically to address the local minima and outlier issues.

5.4 Development of the study classification methodology

Prior to carrying out the main assessment, which is described in detail in later sections, some extensive preliminary analysis was carried out, using 2011 England and Wales census data for Jewish residents aggregated at local authority level. That analysis confirmed the instability of the *k*-means approach with a variety of solutions (local minima) being produced. It also confirmed that the inclusion or exclusion of outlier cases produced different results over a wide range of number of clusters when using Ward's method, and also using the *k*-means technique.

Bearing in mind everything that has been identified and discussed so far, a hybrid classification approach has been devised, based around:

1. Identifying cases where the closest neighbour distance can be regarded as an outlier.
2. Using Ward's approach to cluster the (non-outlier) cases.
3. Running a *k*-means clustering on the dataset without outliers, using the Ward cluster centres as a starting point, to re-allocate cases to their nearest cluster, and produce final cluster centres.
4. Adding the outliers back into the dataset and, using the final cluster centres, allocating the outliers to classes.
5. Mapping the results and finalising the number of classes to be used.

The methodology avoids using the *k*-means approach with a random starting point – so the issues surrounding the optimisation process do not arise. Similarly, the issue of outliers is taken out of the process; their re-incorporation at the end ensures that all cases can be involved, but outliers do not influence the position of class centres. A preliminary choice of the range of number of clusters can be made early in the process, but this can be revised, and the final choice is left to the qualitative judgement of the researcher so that the purpose to which the classification is to be put can be accounted for (Harris, Sleight, and Webber, 2005).

5.5 Development of analysis units (cases)

The modelling approach outlined above has relevance for many geodemographic analyses. However, attempting a geodemographic classification of a small and unevenly distributed minority group raises a second and more specific challenge: the development of an appropriate geographic base. Output Areas (OAs)

are the basic building blocks for census output. OAs were specifically devised by ONS to represent homogenous areas as far as the nature of the residential dwellings contained within them is concerned, and have a typical population of about 300 persons. For analysis purposes, small groups of OAs (typically five) have been linked (by ONS) to form lower layer super output areas (LSOAs), and small groups of LSOAs (again typically five) aggregated to form middle layer super output areas (MSOAs), with an average population of 7,800.

Depending on the degree of sophistication being sought, assessments of the total population can be based on any of these levels, in the knowledge that each case will have sufficient population for reliability of characteristics, and cases will be of broadly similar sizes (avoiding any need for weighting of cases). However, simple selection of one geographic level is not appropriate for a classification based on an unevenly distributed minority population, such as Jewish residents of England and Wales (Martin, 1998). Ideally, pre-defined boundaries would be set aside completely, and appropriate case areas identified through examination of micro-level information along the lines described by Spielman and Logan (2013). However, for the current study, confidentiality requirements mean that case areas must be defined from aggregate data that are associated with fixed levels of census geography.

That some individuals identify as Jews on a cultural, ethnic, or secular basis, rather than simply as a matter of religion has been discussed by other researchers (Goldstein, 1992; Graham and Waterman, 2005). The influence of the wording and positioning of the religion question in the England and Wales census on the responses produced, and the extent to which under- or over-reporting might result have also been considered by others (Voas and Bruce, 2004; Graham and Waterman, 2005; Voas, 2007). It must also be acknowledged that responding to the census religion question was voluntary. However, although the 2011 census non-response rate for the question, at 7%, was above, for example, that for ethnic group (3%), address one year ago (5%), or marital status (4%), unlike all other questions, ONS did NOT impute answers to cover non-responses (ONS, 2012c). The published outputs for religion thus represent actual responses given by individuals (or those replying on behalf of another household member). For the purposes of this paper, therefore, and noting the above matters, a Jew is defined as someone who self-identified (or allowed themselves to be identified) as such in the 2011 England and

Wales census. (*Note that a more detailed discussion of this point has been included in Chapter 2*). The resulting totals from this and the 2001 census are broadly in line with earlier estimates prepared by the Board of Deputies of British Jews using other sources (Schmool and Cohen, 1998).

The average number of self-identifying Jews per MSOA in the 2011 census is 37. Jews are very unevenly distributed across the country. Indeed, 471 MSOAs report zero Jews and, in total, 3759 MSOAs (52% of all MSOAs) report seven or fewer Jewish residents (Source: Census Table KS209EW). It should be noted that, in any event, the record swapping technique that ONS has adopted to prevent identification of individuals (ONS, undated) is likely to mean that information for these MSOAs is not reliable, and a minimum threshold needs to be set for data reliability. Thus, rather than seeking to divide the whole country into appropriate geographic analysis units (as would be the standard approach), large areas of the country that report minimal numbers of Jewish respondents have been omitted for reasons of data reliability.

The term 'accumulation' has been selected as defining geographic areas that delineate places where Jews reside; an alternative term might be 'community', though use of that term could imply some qualitative or social input to the process. Accumulations of Jews to be included in the analysis were selected as follows. As almost 90% of Jews live in MSOAs that are home to at least 18 Jews, that figure was used as an initial threshold. This was modified downwards for urban areas and upwards for rural areas so as to also make some allowance for areal density (as well as density within the wider population) in identifying accumulations. All MSOAs exceeding the threshold were located, and where such MSOAs were adjacent to each other a continuous accumulation was formed. Cluster analysis uses variables that are frequently defined as ratios – for example, the proportion of the population aged under 16, or the proportion of households with two or more cars available. Thus, a minimum accumulation size was set to ensure stability of such measures. This process identified 29 accumulations, each with at least 200 Jewish residents, and which include 237,000 Jews (90% of the England and Wales total).

Table 5.1 provides a basic summary of the features of the accumulations. Note that the location of the larger accumulations can be found on Figure 5.1.

Table 5.1 Basic characteristics of Jewish accumulations in England and Wales, 2011

Accumulation	No of MSOAs	**Jewish Residents**	Jewish Residents per 100 Ha	Jews per 100 Usual Residents	Proportion of E&W Jews	Proportion students (if >15%)
Newcastle	23	**660**	3	0.28	0.3%	
Gateshead	14	**2,939**	68	2.82	1.1%	34%
Leeds	73	**6,850**	14	1.29	2.6%	
Hull	17	**244**	3	0.18	0.1%	
Sheffield	22	**544**	6	0.29	0.2%	26%
Gtr Manchester Area	164	**24,630**	27	1.87	9.4%	
Liverpool	30	**2,023**	35	0.86	0.8%	
Southport	12	**349**	6	0.38	0.1%	
Blackpool & St Annes	27	**567**	8	0.27	0.2%	
Birmingham & Solihull	54	**1,871**	14	0.43	0.7%	38%
Warwick	8	**208**	3	0.25	0.1%	31%
Nottingham	39	**1,366**	7	0.44	0.5%	54%
Leicester	11	**299**	13	0.27	0.1%	17%
Southend	42	**2,665**	10	0.72	1.0%	
Norwich	16	**263**	5	0.17	0.1%	21%
Cambridge	25	**1,105**	3	0.52	0.4%	31%
Luton	21	**326**	8	0.16	0.1%	
Milton Keynes	26	**421**	2	0.20	0.2%	
Oxford	25	**1,194**	8	0.56	0.5%	35%
Worthing	19	**343**	6	0.22	0.1%	
Brighton	64	**3,380**	5	0.65	1.3%	
Eastbourne	19	**330**	1	0.22	0.1%	
Sevenoaks & Borough Gn	10	**210**	1	0.23	0.1%	
Canterbury & Whitstable	12	**200**	2	0.20	0.1%	27%
Thanet	12	**220**	7	0.23	0.1%	
London Area	1368	**180,410**	26	1.63	68.5%	
Bournemouth	52	**2,007**	5	0.48	0.8%	
Bristol	23	**605**	18	0.32	0.2%	34%
Cardiff	28	**714**	8	0.34	0.3%	
All accumulations	2256	**236,943**	19	1.29	90.0%	
All other areas	4945	**26,403**	0.2	0.07	10.0%	
England and Wales TOTAL	7201	**263,346**	1.7	0.47	100.0%	

Source: Derived from Census Tables KS209EW, DC1202EW, DC6205EW, and KS101EW

The accumulations in Northern England, the Midlands, the South West and Wales are free-standing, whereas in the South East many of the accumulations are almost contiguous with each other and with the large London Area accumulation, which includes the majority of Jews in England and Wales.

Considerable information would be lost if all analysis was carried out at the accumulation level (particularly in London). Therefore, data within the accumulations have been examined to identify analysable individual MSOAs and groups of MSOAs. In general, any MSOA accommodating about 300 or more Jews has been regarded as of sufficient size to represent an analysis unit on its own; small MSOAs have been aggregated to produce groups of generally 300 to 700 Jewish

residents, in spatially contiguous MSOAs. Furthermore, the 18 most populous MSOAs were replaced by their 92 constituent LSOAs to reduce the range of analysis group population sizes.

The end result is that the original 29 accumulations with 200 or more Jewish residents have been disaggregated, using a hybrid system cutting across the geographic levels, into 407 analysis groups (median size 512 Jewish residents) as follows:

- 14 multi-MSOA whole accumulations;
- 172 multi-MSOA parts of accumulations;
- 129 single MSOAs (each part of a larger accumulation); and
- 92 single LSOAs (each part of the London or Greater Manchester accumulation).

Although the analysis group system described here relates specifically to Jewish residents of England and Wales, the approach could be applied to other ethnic or religion-based groups or, indeed, to many other sub-populations.

5.6 Identification of analysis group characteristics (variables)

The final element required to carry out a geodemographic classification of a minority group, such as Anglo-Jewry, is to determine the demographic and socio-economic characteristics of that sub-population, on which the assessment will be based. The 2011 England and Wales census recorded the circumstances of individuals and households on 27 March 2011. Around 50 different characteristics of Jewish respondents in the fields of gender, fertility, migration, age structure, birth country and ethnicity, household composition, education and employment, and social and well-being measures were developed from data extracted from 2011 census output tables published by ONS. Following others, such as Vickers, Rees, and Birkin (2003, 2005), the intention was to produce a dataset including variables across the spectrum of demographic, social/living arrangement, education, employment, and housing fields, and thus ensure that a broadly-based classification would be produced. Such are the number of cross-tabulations by religion produced by ONS that this can readily be achieved; data paucity is not an issue here.

In standard census outputs, students are recorded at their term-time address. Students who are living away from their pre-student residence may have only a

transient association with their term-time locality. Insofar as understanding the characteristics of the Jewish population of a locality is concerned, particularly if the assessment is intended to shed some light on the future outlook for that population, there is an argument for trying to identify characteristics that reflect the 'host' population, and limit any 'distortion' which the inclusion of students in the derivation of the variables might introduce. A number of the characteristics identified sought to exclude students (from both numerator and denominator).

The initial extraction of characteristics included a number that were simply alternative ways of measuring a single parameter such as fertility, or average age. A first sift thus reduced the number of variables down to 25, and the ranges of values for these characteristics are shown in Table 5.2[7]. Further preparation of the data, to ensure that: assumptions of normal distribution of variables were not compromised; each variable carried equal weight in the assessment; and to avoid excessive multi-collinearity whilst still ensuring a comprehensive and balanced range of variables; led to the selection of the final 17 variables, as noted in the final column of Table 5.2 (see Everitt et al, 2011; Openshaw and Wymer, 1995; the approach adopted by Vickers, Rees, and Birkin, 2005; and the advice of Voas and Williamson, 2001).

5.7 Implementing the classification process

With the clustering technique in place, geographic cases determined, and population variables identified, the classification process was implemented (using IBM-SPSS software) in accordance with the five step methodology previously described. As required for the correct implementation of Ward's method, the 'distance' between cases and cluster centres was defined as the squared Euclidian

[7] The majority of characteristics need no further definition. The fertility indictor is a child:woman ratio based on the number of persons aged 0-9 in the census, and females aged 25-44 – an age range intended to cover the majority of mothers of the 0-9 year olds, whilst avoiding any artificial reduction in the ratio in areas with high numbers of students (aged largely under 25). This fertility indicator can be thought of as a proxy for Total Fertility Rate. The migration indicator has the same format as the fertility indicator, but compares the number of 25 to 34 year olds (post-student young adults) with the number of females in the previous generation (55 to 64 year olds); only females are counted for the older age band to avoid issues of mortality which might have a measurable impact on males in that age range. Low values of the indicator imply that young adults have moved away from the area; high values that there is in-migration of young adults to the area.

Table 5.2 2011 values of characteristics for analysis groups

Characteristic	10th %ile	lower quartile	Median	upper quartile	90th %ile	Mean	Transformed/ Used in Assessment
Total Fertility Indicator (all 0-9 / females 25-44)	0.82	1.18	1.66	2.33	4.44	2.18	Cube Root
Migration Indicator (25-34/females 55-64)	0.57	0.97	1.73	3.66	5.74	2.71	Cube Root
Average Age (exc students)	32.3	39.1	44.4	50.7	55.8	44.1	NOT used
Proportion age 0-15 (exc students)	0.09	0.13	0.17	0.25	0.38	0.21	Logarithm
Proportion age 65 and over (exc students)	0.09	0.15	0.22	0.31	0.41	0.24	Square Root
Proportion economically 'inactive'	0.22	0.27	0.34	0.41	0.49	0.34	NOT used
Proportion self-employed (of employed)	0.20	0.25	0.30	0.35	0.39	0.30	Not transformed
Proportion looking after home or family (of inactive)	0.04	0.07	0.12	0.20	0.31	0.15	Square Root
Proportion in higher/middle managerial roles (of all employed)	0.40	0.47	0.55	0.63	0.71	0.55	NOT used
Proportion with no qualifications (of 16+)	0.06	0.10	0.15	0.24	0.34	0.18	Square Root
Proportion with degree qualifications and above (of 16+)	0.19	0.31	0.42	0.54	0.64	0.43	Not transformed
Proportion of employed in wholesale and retail trade	0.08	0.11	0.14	0.17	0.20	0.14	Not transformed
Proportion of employed in professional, scientific and technical areas	0.08	0.12	0.16	0.19	0.23	0.16	Not transformed
Proportion of employed in education	0.07	0.09	0.12	0.16	0.26	0.14	Logarithm
Proportion of employed in health and social work	0.07	0.09	0.11	0.13	0.15	0.11	NOT used
Proportion UK born	0.67	0.74	0.82	0.90	0.94	0.81	Square
Proportion white-British ethnic group	0.56	0.68	0.78	0.88	0.92	0.76	NOT used
Proportion non-white ethnic group	0.02	0.04	0.06	0.10	0.15	0.08	NOT used
Proportion single person	0.17	0.24	0.33	0.40	0.48	0.32	Not transformed
Proportion married or civil partnership (of families)	0.47	0.54	0.63	0.70	0.79	0.62	Not transformed
Married as proportion of married + cohabiting	0.74	0.82	0.90	0.95	0.98	0.87	Cube
Proportion of households short of room or bedroom	0.02	0.04	0.06	0.13	0.20	0.09	NOT used
Proportion of households in owned or shared ownership tenure	0.44	0.63	0.77	0.86	0.91	0.72	Square
Proportion of households with zero cars	0.05	0.09	0.16	0.29	0.43	0.20	NOT used
Proportion of households with 2 or more cars	0.09	0.19	0.33	0.47	0.57	0.34	Not transformed

Source: Calculated from 2011 Census Tables: DC/LC1202EW, DC/LC2107EW, DC/LC2201EW, DC/LC2207EW, DC/LC4202EW, DC/LC4207EW; DC/LC4208EW, DC/LC5204EW, DC/LC6205EW, DC/LC6207EW, and DC6212EW

distance between the cases, as measured (in this case) in 17 dimension/variable space. For each case, the squared Euclidian distance to its nearest neighbour was determined; the case was considered to be an outlier if this distance was more than 1.5 times the inter-quartile range of such distances above the upper quartile value.

Step 1 identified 18 such outlier cases that were temporarily excluded. Table 5.3 shows the allocation of the remaining 389 cases to eight to four cluster solutions using Ward's method (Step 2). Table 5.4 summarises the situation as regards final numbers of cases in each cluster for each potential solution (following the *k*-means clustering and re-introducing of outlier cases – Steps 3 and 4); it also indicates the number of cases that were re-allocated from the cluster in which they had been located in Table 5.3. Because of the re-allocation of cases (and some slight variation in the allocation of outliers to clusters), the strict hierarchical association between the different solutions in Table 5.3 is not fully maintained in Table 5.4 – so the braces in the latter table only provide an indication of the main source of the cluster. The *k*-means algorithm tends to 'shed' cases from combined clusters, and, overall, one in seven to one in four cases has been re-allocated through the *k*-means process.

The novel aspects of the clustering methodology are thus the use of Step 1 and Step 4 to avoid outlier cases distorting the classification, and the application of the *k*-means technique in Step 3 using objectively-determined initial cluster centres rather than potentially local minimum generating random or semi-random 'seed' values.

Table 5.3 Allocation of cases to clusters: Ward's method, groups excluding outliers

	Number of Cases allocated to each cluster								Number of Clusters formed
Cluster	***i***	***ii***	***iii***	***iv***	***v***	***vi***	***vii***	***viii***	
Cycle									
381	27	16	80	59	63	36	65	43	8
382	27	16	80	59	63	36	108		7
383	27	96		59	63	36	108		6
384	27	155			63	36	108		5
385	27	155			99		108		4

Table 5.4 Allocation of cases to clusters: k-means method including all cases

Number of Cases allocated to each cluster								Number of Cases Re-allocated	Number of Clusters formed
Cluster i	***ii***	***iii***	***iv***	***v***	***vi***	***vii***	***viii***		
30	23	58	56	59	52	81	48	92 (24%)	8
30	23	70	76	62	48	98		68 (17%)	7
32	83		79	64	48	101		68 (17%)	6
33	133			71	58	112		55 (14%)	5
33	143			104		127		60 (15%)	4

Having produced five possible classifications, ranging from 4 to 8 classes, the next challenge is to select the 'best' one. There is no standard agreed method for this; indeed Everitt et al having discussed the issue at some length, conclude by quoting from Baxter (1994) that 'informal and subjective criteria, based on subject expertise, are likely to remain the most common approach' (2011, p96). The overall process leads to a geodemographic consideration of the characteristics of the population – so it is essential that a spatial element to the determination of the number of classes should be incorporated and, using esri-ArcGIS software, map plots of the various solutions were prepared.

Thus, whilst extensive consideration was given to the quantitative techniques derived from earlier work on classifying census data (Vickers, Rees, and Birkin, 2003, 2005), the primary input to the determination of the appropriate number of classes to include in the analysis group assessment was a visual and quantitative consideration of the spatial distribution of the different clusters produced by the different solutions. The starting point was the 6-class solution (as summarised in Table 5.5), in part due to the guidance from the quantitative tests.

In determining which solution to select, consideration has been given to the balance of population between the classes, and the 'stability' of the classes. It would be prudent to avoid selecting a class that was disproportionately large and might be worthy of sub-division, or one that is transient in the process – for example, a class that exists in the 'n' class solution, but is split into two in the 'n+1' class solution and merged with another class in the 'n-1' class solution; this would imply that the class

was not particularly distinct from other classes. Table 5.5 shows the largest class (D/E) includes 24% of the population but it exists in only this solution; it could be considered as not a very robust grouping.

Table 5.5 Allocation of groups and population to classes – 6 class solution

Class	No of Groups	Jewish population	Proportion of population	Exists in solutions with
A	64	32445	14%	5 to 9 classes
B	48	21459	9%	5 to 13 classes
C	32	25445	11%	2 to 21 classes
D/E	83	56293	24%	6 classes only
F	79	49853	21%	6 to 12 classes
G	101	51448	22%	4 to 7 classes

Moving from 6 to 5 classes would merge Classes D/E and F. Such a merger results in one very dominant Class D/E/F accommodating almost 40% of the Jewish population, and reducing the usefulness of the classification process. Moving from 6 to 7 classes would split Class D/E into separate D and E and produce a solution that is stable over a wider range of classes (see Table 5.6).

Table 5.6 Allocation of groups and population to classes – 7 class solution

Class	No of Groups	Jewish population	Proportion of population	Exists in solutions with
A	62	31317	13%	5 to 9 classes
B	48	21459	9%	5 to 13 classes
C	30	23610	10%	2 to 21 classes
D	23	21256	9%	7 to 31 classes
E	70	39740	17%	7 and 8 classes
F	76	49495	21%	6 to 12 classes
G	98	50066	21%	4 to 7 classes

The seven class solution is shown in Figure 5.1; it displays a clear spatial grouping of adjoining areas in the same classes. A change from 7 to 8 classes would result in splitting Class G into two classes. Unlike the move from six groups to seven, which 'exposes' a geographically distinct subdivision within a class, the move from seven to eight groups produces a much less clear visual narrative. Clearly, as the number of classes increases, there is scope for greater differentiation between groups; ultimately, however, groups with relatively little difference between them become allocated to different classes, and the increase in class number starts to detract from the spatial

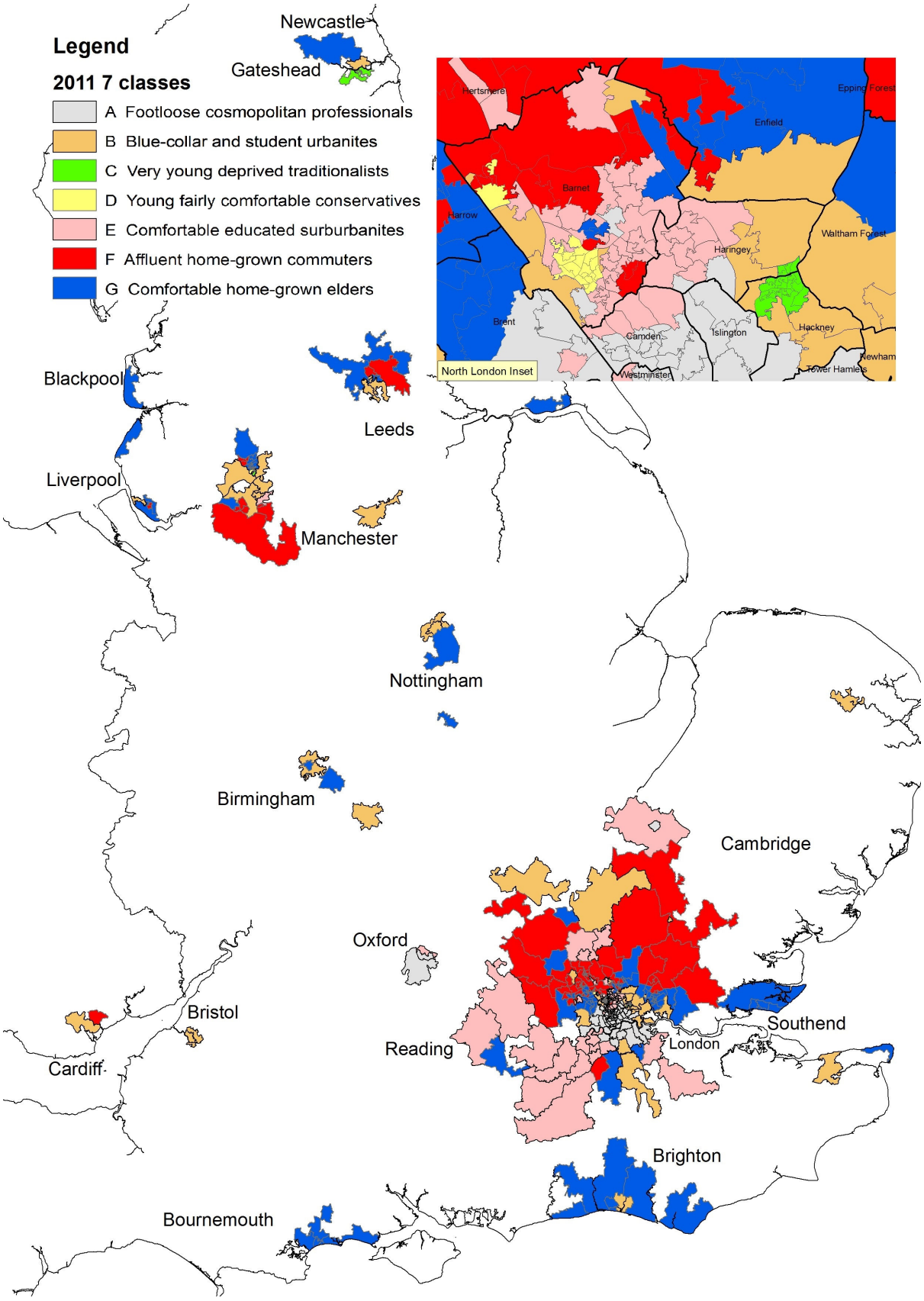

Figure 5.1 Group classification based on 7 classes

element of the assessment. Bearing in mind that the aim of the process is 'to get a good classification of the data that is well suited to the users' needs' (Harris, Sleight, and Webber, 2005, p182), the seven class solution is preferred.

There is considerable variation in the areal density of the Jewish population of England and Wales, such that the representation of the classification shown in Figure 5.1 could be misleading in terms of the numerical size of each group, and the proportion of Anglo-Jewry actually included in the classification process, as the map is based on a standard projection in which the size of areas on the map is proportional to the topographic area on the ground. However the relative strengths of each accumulation and the population balance between classes is more immediately conveyed through the use of a cartogram in which areas on the map, rather than being determined by physical area on the ground, are intended to be proportional to the Jewish population of the area. Such a representation is shown in Figure 5.2, which attempts not only to re-cast the map to represent the Jewish population but nevertheless still retains the correct adjacencies (somewhat distorted) of each MSOA; indeed, such is the major variation in Jewish areal density that the area/population proportionality cannot be fully maintained in all areas of the diagram.

5.8 Analysis of the classification system

The implementation of the methodology described above yields the first comprehensive picture of the socio-demographic geography of Anglo-Jewry; and, to the author's knowledge, the first ever geodemographic classification in print that encompasses only a single minority population group. In this section, attention is turned to outlining the geodemographic classes into which the Jewish population falls, disaggregating both mainstream and strictly orthodox Jews, and the geography of these classes. The final section of this paper draws out the wider implications of these results, both for the study of the Jewish population in England and Wales, and for the art of geodemographics more generally.

Some of the characteristics are more important in differentiating the classes than are others. Figure 5.3 demonstrates the relative importance of each variable. The graph shows the scale of the F-value for each variable – that is, the ratio of the root of the sum of the squares of the differences between classes to the root of the sum of the squares of the within class differences, for the standardised transformed

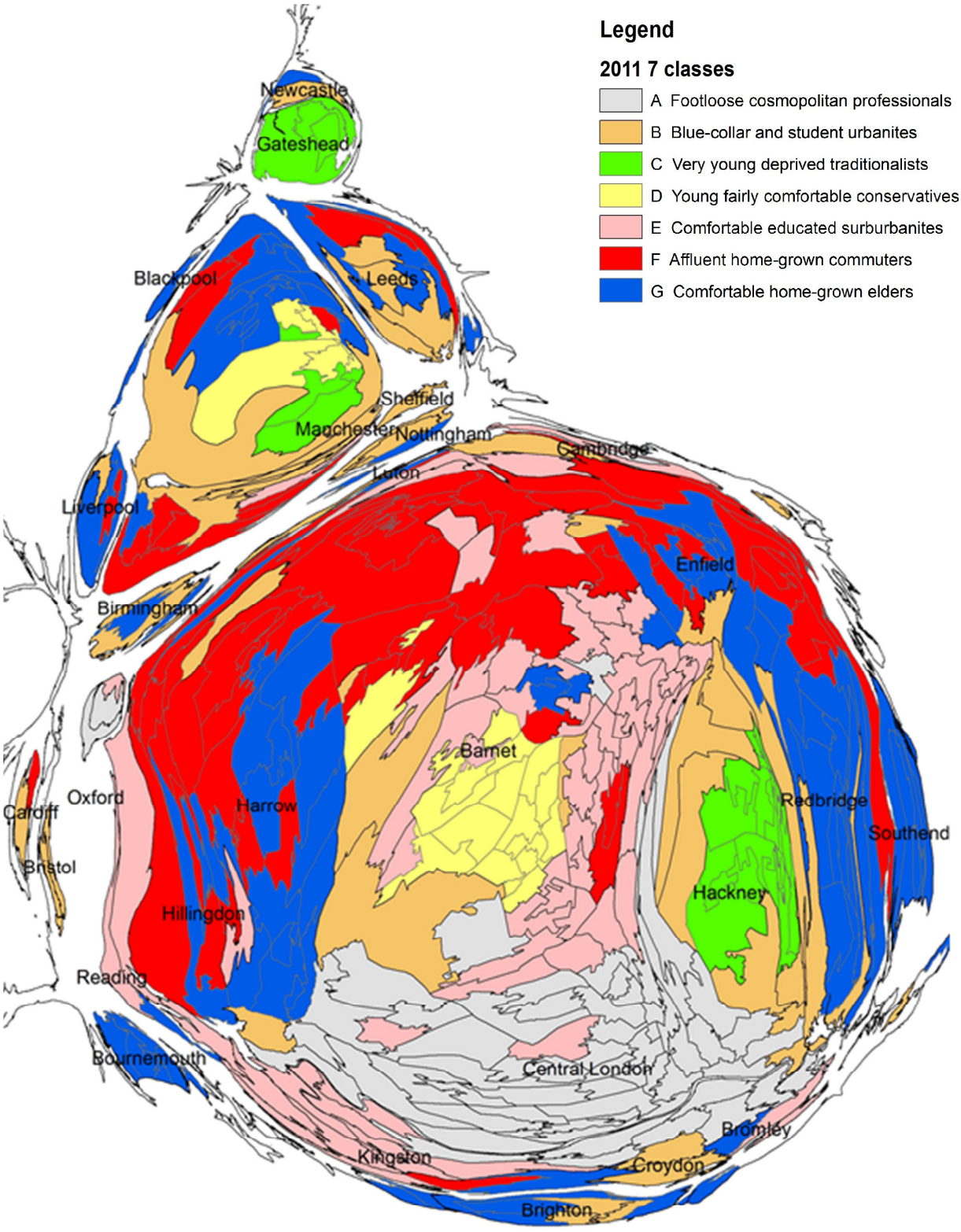

Figure 5.2 Seven group classification projected on a Jewish population cartogram

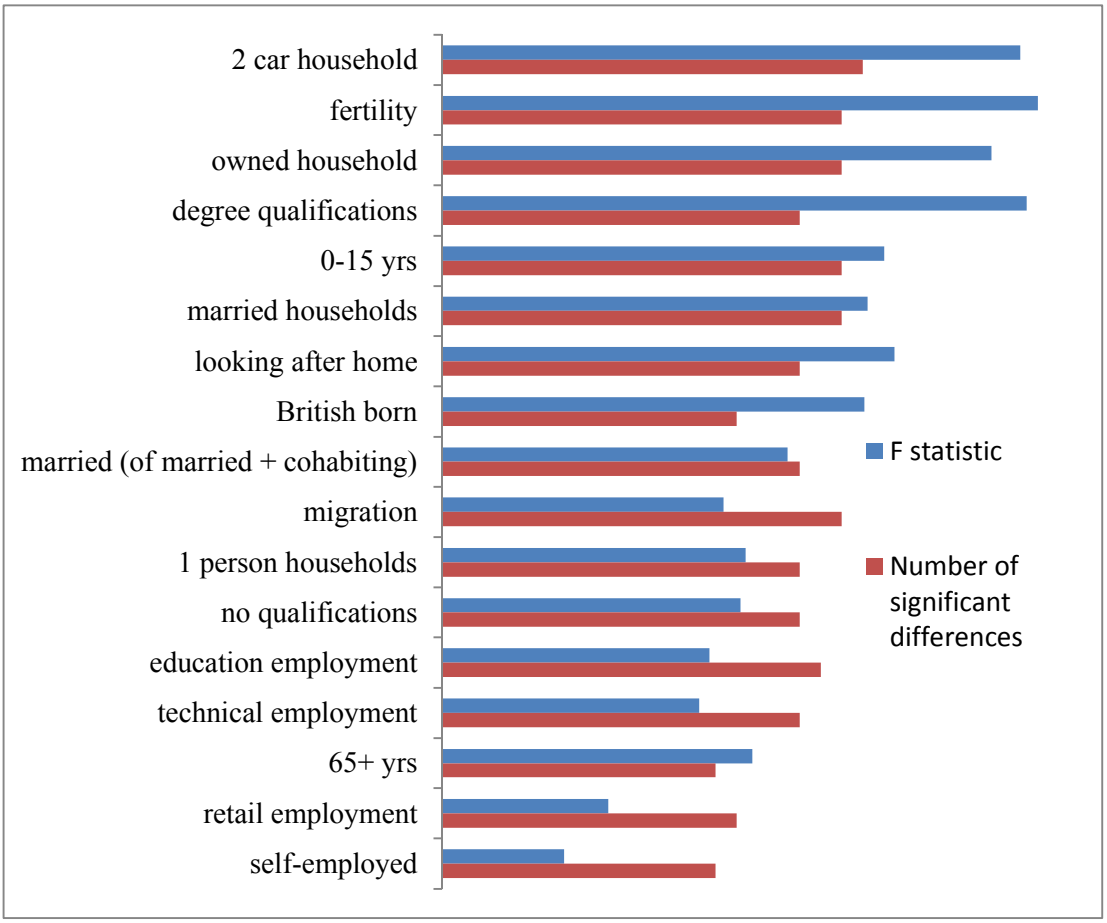

Figure 5.3 Variables ranked by importance in distinguishing between classes

versions of the variables all of which are significant at the 1% level (actual F values range from 34 to 170). The following line for each variable on the graph indicates how many of the means for each class are significantly different to the other classes at the 5% level. (As there are 7 classes, if every pairing of classes was significantly different, the figure would be 21 – the range found is from 13 to 20). The variables are listed in descending order of 'importance' in distinguishing between classes – from two-car availability household proportion to proportion of employed persons in self-employment.

Table 5.7 sets out the mean values for each of the 17 variables used in the assessment, for each class; highest and lowest values are emboldened and italicised, respectively. Class C is emphasised by its taking up first or last place in all but two of the variables considered; Class A has a first or last ranking for seven variables. The mean values for each variable for all Jewish Residents and All Residents of England

Table 5.7 Mean values by class for variables used in the classification process

	Demographic Variables					Socio-Economic Variables									Household structure Variables		
Class	Fertil-ity	Migra-tion	0-15 yrs	65+ yrs	British born	no qualifi-cations	degree qualifi-cations	self-employed	looking after home	retail employ-ment	technical employ-ment	education employ-ment	owned house-hold	2 car house-hold	1 person house-holds	married house-holds	married proportion (of married + cohabiting)
A	*1.00*	4.81	0.13	0.20	*0.64*	*0.09*	**0.62**	0.32	0.14	*0.09*	**0.21**	*0.09*	0.60	0.17	0.42	0.58	*0.76*
B	1.47	3.33	0.16	0.23	0.80	0.19	0.39	0.24	0.08	0.14	0.12	0.15	0.56	0.21	**0.43**	*0.51*	*0.76*
C	**7.38**	**7.23**	**0.56**	*0.06*	0.76	**0.39**	*0.14*	*0.17*	**0.46**	0.16	*0.06*	**0.37**	*0.39*	*0.07*	*0.15*	**0.88**	**0.98**
D	4.09	3.75	0.36	0.17	0.76	0.17	0.38	0.29	0.26	0.14	0.15	0.21	0.70	0.33	0.24	0.75	0.97
E	2.04	2.23	0.23	0.19	0.78	*0.09*	0.58	0.33	0.18	0.11	0.19	0.13	0.80	0.40	0.29	0.67	0.90
F	2.13	1.16	0.21	0.22	**0.90**	0.14	0.42	**0.34**	0.16	**0.17**	0.18	0.11	**0.89**	**0.59**	0.23	0.68	0.93
G	1.37	*1.01*	*0.11*	**0.38**	**0.90**	0.27	0.31	0.30	*0.06*	**0.17**	0.14	0.12	0.81	0.34	0.38	0.53	0.88
All Jews	2.17	1.86	0.22	0.23	0.81	0.18	0.42	0.30	0.13	0.14	0.16	0.13	0.73	0.36	0.33	0.64	0.88
All E&W	1.72	2.26	0.20	0.18	0.87	0.23	0.27	0.16	0.13	0.16	0.07	0.10	0.64	0.32	0.30	0.65	0.77

Table 5.8 Summary of characteristics of each class

Variable Class	A	B	C	D	E	F	G
Fertility (all 0-9 cf female 25-44)	very low 1.0	low 1.4	very high 7.4	high 3.1	average 2.0	average 2.1	low 1.3
Migration (25-34 cf female 55-64)	very high 4.8	high 3.3	excep high 7.2	high 3.7	average 2.1	very low 1.2	very low 1.0
Average age (exc students)*	average 44	average 46	very low 23	low 35	average 42	average 45	high 54
Age 0-15 (exc students)	low 13%	low 16%	excep high 56%	high 36%	average 22%	average 20%	very low 11%
Age 65 plus (exc students)	average 20%	average 23%	excep low 6%	average 17%	average 19%	average 22%	very high 38%
student proportion*	average 10%	high 23%	high 23%	average 10%	average 7%	average 7%	average 6%
self-employed (propn of employed)	average 31%	below average 23%	low 17%	average 29%	average 32%	average 33%	average 29%
look after home (of inactive)	average 14%	low 8%	very high 46%	high 26%	average 18%	average 16%	low 6%
NS-SeC 1&2 (of all classified)*	very high 69%	average 51%	below average 45%	average 54%	high 65%	average 54%	below average 45%
no qualifications (over 16s)	low 9%	average 17%	very high 39%	average 17%	low 9%	average 14%	high 26%
degree qualified (over 16s)	very high 62%	average 38%	very low 14%	average 38%	high 57%	average 41%	below average 32%
retail employment	low 9%	average 14%	average 16%	average 14%	low 11%	average 17%	average 17%
professional/tech employment	high 21%	below average 12%	very low 6%	average 16%	average 18%	average 17%	average 14%
education employment	below average 9%	above average 16%	very high 37%	high 22%	average 13%	average 11%	average 12%
UK born	low 64%	average 80%	average 76%	average 76%	average 78%	very high 90%	very high 89%
Europe born*	high 11%	average 6%	above average 8%	above average 8%	average 5%	low 2%	average 4%
Asia / Mid East born*	average 8%	average 6%	above average 11%	above average 10%	average 7%	low 3%	low 3%
America born*	very high 10%	average 4%	average 4%	below average 2%	average 4%	low 1%	low 1%
White British ethnicity*	very low 60%	average 72%	very low 62%	average 72%	average 73%	high 88%	high 87%
White non-British*	very high 31%	average 16%	high 23%	average 17%	average 19%	low 8%	low 8%
'Other' ethnicity*	average 9%	above average 12%	high 15%	above average 11%	average 8%	low 4%	low 4%
1 person households (of all h/holds)	very high 42%	very high 42%	very low 15%	below average 24%	average 29%	below average 23%	high 38%
Propn of 1 person h/holds over 65*	low 33%	below average 38%	average 49%	high 60%	average 46%	average 53%	high 58%
married/civil part propn of families	below average 58%	low 52%	very high 88%	high 75%	average 67%	average 68%	low 52%
cohabiting propn of families*	high 19%	high 16%	low 2%	low 3%	average 8%	average 5%	average 7%
lone-parent propn of families*	above average 10%	high 15%	low 5%	average 7%	average 8%	average 8%	above average 11%
over 65s prop of families*	average 14%	average 16%	very low 4%	average 13%	average 15%	above average 18%	high 29%
ratio married:(married+cohab)	very low 76%	very low 76%	high 98%	high 97%	average 90%	above average 93%	average 88%
h/holds with room shortage*	above average 16%	above average 13%	high 20%	average 8%	average 6%	very low 3%	average 6%
h/holds with home ownership	low 60%	low 57%	very low 39%	average 70%	above average 79%	high 88%	above average 81%
h/holds with zero car availability*	very high 39%	high 33%	average 20%	low 10%	below average 13%	very low 7%	average 20%
h/holds with 2-car availability	very low 16%	low 23%	excep low 7%	average 33%	high 41%	very high 59%	average 34%

* indicates a characteristic of interest, but not used directly in the cluster analysis/classification process

and Wales are also included in the table. A more detailed summary is provided in Table 5.8. The table complements the ranking table (Table 5.7) – where the differences between classes are not significant, they share the same description in Table 5.8, irrespective of precise ranking. Words such as 'average', 'below average', etc are relative to the overall picture for Jewish residents of England and Wales.

The seven classes fall locationally into three distinct categories: two central/inner urban classes (Classes A and B); two very compactly-formed non-central urban classes (Classes C and D), and three suburban/commuter-belt/coastal classes (Classes E, F, and G). Although there is a geographical similarity between the groups in Class C and D, these similarities are peripheral and coincidental to the main common thread that links groups in both of these classes. All groups in Class C are found in just three locations – Stamford Hill (London), Broughton Park (Greater Manchester), and Gateshead (NE England). Those in Class D are all found in or near Golders Green/South Hendon (London), and in Broughton Park. The over-riding common theme to these areas is that they are the home to Britain's strictly orthodox Jewish communities (Vulkan and Graham, 2008; Graham, 2013a). This overall category is more usefully referred to by a non-geographic tag, Orthodox Enclaves. The classes are described as follows.

Two classes cover the Jewish population living in *inner urban* areas:

Class A - Footloose cosmopolitan professionals. This class has a low proportion of 0 to 15 year olds, and a very high proportion of single person households. The level of cohabitation is very high, and home ownership is low. The class has a particularly low fertility level, and a very high proportion holding a degree, with professional and technical employment levels, and higher and middle management positions also higher than all other classes. The proportion born in the UK is very low, and the class has a strong central London focus (57 contiguous analysis group areas). The only other Class A groups are found in Oxford and Cambridge, whose universities have a strong international pull.

Class B - Blue-collar and student urbanites. This class also has a low proportion of 0-15 year olds and a high proportion of single person households; outside of London there is a strong student focus to the class. The ratio of 30 year olds to 60 year olds is high indicating in-migration of young adults (but producing

relatively few children). Self-employment is below average (compared with the Jewish population as a whole). The class also exhibits the highest proportion of lone-parent families, and an above average level of room overcrowding and low levels of home and car ownership. Geographically, the student groups in this class are located in provincial towns and cities with popular universities; all other provincial Class B groups are located adjacent to student groups in the major conurbations. The major concentration of non-student Class B groups is in inner north east London.

Two classes fall within *orthodox enclaves,* and their characteristics are highly influenced by the centrality of strict observance of religious precepts in the lives of their residents:

Class C - Very young deprived traditionalists. Class C has a very high fertility rate and complementary to this feature, over half the Jewish population of Class C is aged below 16, with a very low proportion aged 65 or more. The proportion of adults who are looking after home or family is extremely high as is the proportion engaged in education employment. This class also exhibits high levels of room overcrowding, very low levels of home and car ownership, and very low levels of (secular) educational qualifications.

Class D - Young fairly comfortable conservatives. This class also has a much higher than replacement fertility rate (but less than half the value of Class C), with a proportion of 0 to 15 year olds noticeably higher than average, and employment in education also well above average. However, in areas such as professional and technical employment, degree level qualifications, room overcrowding, home and two-car ownership, the class values are closer to average.

Three classes located in *suburban, commuter-belt, and coastal* towns, sharing average levels of self-employment, professional and education employment, and level of cohabitation:

Class E - Comfortable educated suburbanites and *Class F - Affluent home-grown commuters.* Both these classes display fertility around replacement levels, and average proportions of 0-15 year olds and of those aged 65 and more. However, Class E varies from Class F in having a noticeably-higher proportion of higher and middle managers, and above average proportion of degree holders, and an average rather than very high proportion of people born in the UK. The number of single

person households is slightly higher for Class E than F. Class E appears to be slightly less affluent that Class F – the level of room overcrowding is around the wider average (whereas Class F is very low); home ownership, whilst above average is lower than Class F. Similarly, 2-car availability, whilst above average is noticeably below that for Class F. There is a distinct pattern to these groups' geographic locations. Class E groups are to be found almost entirely in two distinct areas - the southern part of the London Borough of Barnet, and a large area of south west London, Surrey and Berkshire. Class F groups are to be found primarily in Greater Manchester, and in a large area covering much of Hertfordshire, Essex, parts of adjoining counties, and the northern part of the London Borough of Barnet.

Class G - Comfortable home-grown elders has an average age that is higher than the other classes, a very low proportion of 0-15 year olds, a very high proportion of those aged over 65, a slightly below average proportion of people employed in professional and technical occupations, and a high proportion born in the UK. The proportion of single person households is high, of whom the proportion aged over 65 is also high, reflecting the age profile of the class. Fertility levels for the class are well below replacement. The class has an average level of room shortage and car ownership, and a slightly above average level of home ownership. Class G groups are found in major parts of most larger provincial accumulations, coastal/resort towns, and the NW and NE fringes of Greater London.

Further insight into the nature and future prospects for areas that fall into the various classes can be gleaned through an examination of population pyramids produced by summing the age by gender census data for the groups in each class (as shown in Figure 5.4). The pyramids for Class A and Class B share some similarities. They both exhibit a population bulge; Class A drawing in young professionals (age 25-40) with Class B marked by a large student influx. Both groups have similar short bands for the 0 to 14 age groups – emphasising the low fertility rate for these classes. If it were not for in-migration (from elsewhere in Britain, or from overseas), both these classes would be shrinking rapidly, so the future prospects for areas in both classes will be influenced by their continuing attractiveness to specific age groups.

The population within Class C with its strong concave triangular shape can be expected to increase very rapidly with time. Class D exhibits a 'watered down'

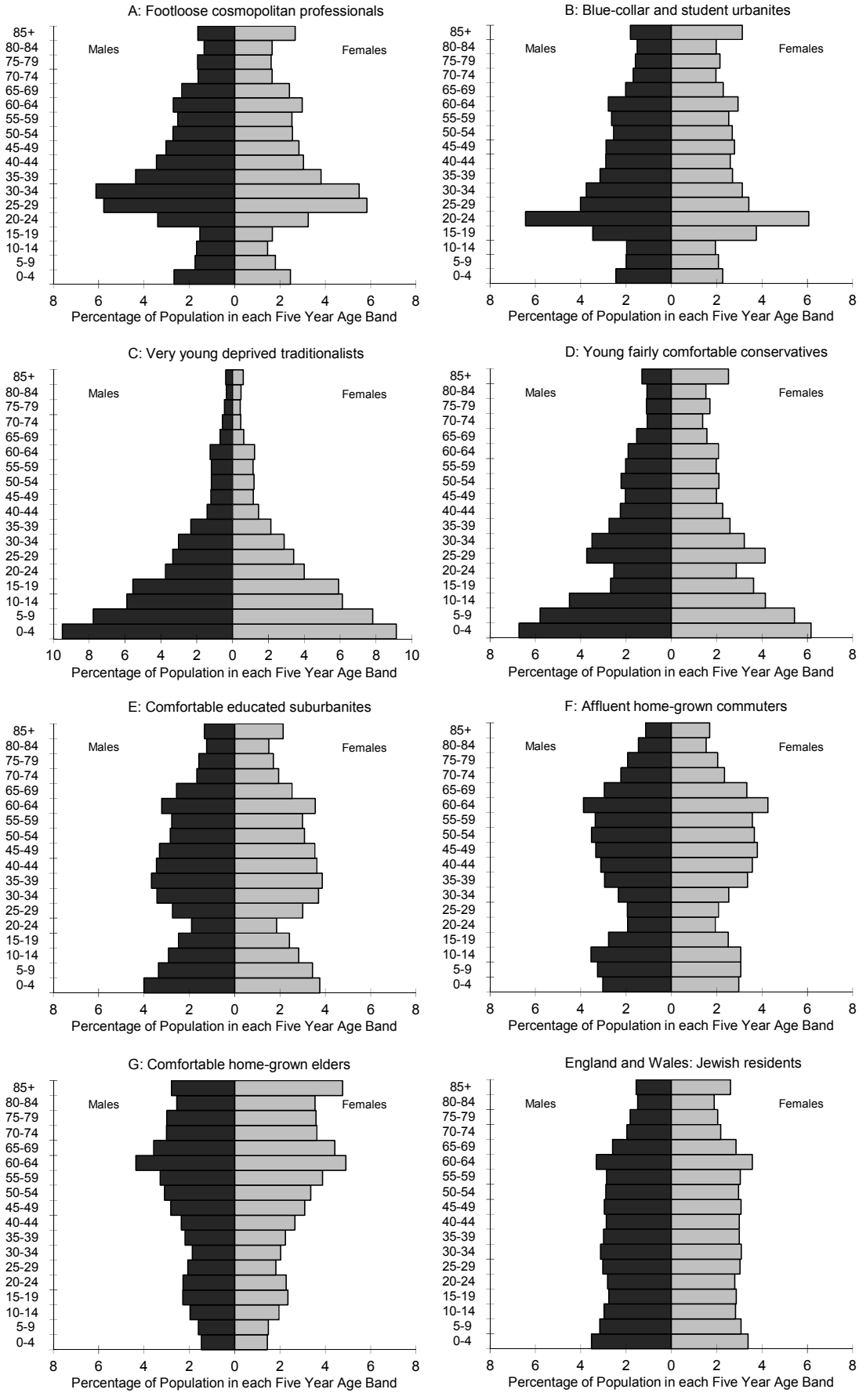

Figure 5.4 Jewish population pyramids

version of the Class C pyramid, with some student loss and young adult bulge, and a much larger older person presence; this class will also be expanding.

Class E and F pyramids indicate some stability, with the numbers in the 0-14 age bands being broadly similar to those in their thirties to fifties. Both classes do show a defined loss of those of student age. The inverted triangle nature of the Class G pyramid implies a declining population size. Although mortality prevents the triangular form widening further into the post 70 age groups, those age groups nevertheless have a larger representation than any of the under 50 year old bands.

An indication of the scale to which the various accumulations of 200 or more Jewish residents are likely to be expanding or contracting can be deduced by considering the balance of different classes present in the analysis groups that form each accumulation. This information is summarised in Table 5.9 which lists the accumulations (with the large London and Greater Manchester areas subdivided into smaller areas) starting with those expanding fastest and finishing with those shrinking most rapidly.

5.9 Discussion and conclusions

The inclusion of a question on religion in the England and Wales census, and the cross-tabulation of religion with a large number of socio-economic, demographic and household structure variables in the census outputs have permitted a detailed examination of the characteristics of Anglo-Jewry in 2011 to be carried out. For the most part, the averages for Jewish residents are not materially different than for all residents of England and Wales. Notable exceptions to this are: the level of self-employment (16% of employed persons for all residents, but 30% for Jewish residents); degree qualified (27% and 42% of over 16s); and professional and technical employment (7% and 16%, respectively). It is, therefore, briefly worth considering whether the classification produced merely reflects the characteristics of the wider population in the relevant areas, or whether there is a distinctiveness to the Jewish classification; do the 'tags' used to refer to each class also apply to the residents of the areas more generally?

Table 5.10 lists those characteristics where the values for Jewish and other residents differ noticeably. The table shows that the greatest confluence between characteristics occurs in Class B and Class E areas, with the widest divergence in Class C and D areas. In these latter areas the very high fertility levels (and

Table 5.9 Main classes present in each accumulation

Main classes of groups	Accumulation (or subdivision of London and Gtr Manchester areas)
	Likely to be expanding at fastest rate
C	Stamford Hill; Gateshead.
Balance of C & D	Broughton Park.
D	Golders Green and Hendon South.
F with some D	Edgware, Mill Hill, & Totteridge.
F	Epping Forest, W Essex & E Herts; West Herts & East Bucks; Trafford South, Stockport & E Cheshire.
F with some E	Hertsmere, Hatfield, & London Colney.
F with some E & G	East & High Barnet, & Cockfosters
E	Hampstead, East Finchley and Muswell Hill; South West London; Central and West Surrey; Sevenoaks & Borough Green.
E with some B	St Albans and North Herts.
E with some G	Finchley & North Hendon; Reading & Maidenhead; Bromley.
Balance of A & E	Oxford; Cambridge.
A	Central and Inner North West and South London.
B	Inner East and North-East London; Manchester and Salford Central; Croydon and Streatham; Bristol, Sheffield, Milton Keynes, Norwich, Warwick, Canterbury.
B with some G	Nottingham; Cardiff.
Balance of G & B	Birmingham & Solihull; Brighton; Newcastle.
G with some B & F	Leeds; Liverpool.
G with some F	Harrow, Hillingdon & Wembley; Prestwich, Whitefield, & Bury; Enfield Town & Broxbourne; Sutton & Epsom.
G	Redbridge, Havering, & Chingford; Southend on Sea; Bournemouth; Blackpool & St Annes, Southport, Worthing, Eastbourne, Luton, Leicester, Hull, Thanet.
	Likely to be shrinking at fastest rate

consequent proportion of persons aged 15 or under) displayed by the Jewish residents are not repeated in the wider community, though these are not the only differences. Perhaps more unexpected is that Jewish residents of both Class D and G areas are more likely to be UK born than their neighbours. Overall, whilst inevitably all residents of areas share a number of characteristics (as the nature of area infrastructure, such as housing types and tenure availability have an influence on all residents), the conclusion is that there is a distinctiveness to the classification produced through analysing a small sub-population.

In developing this classification, the largest challenge – that of developing a suitable geographic base for the small size and very uneven distribution of the Jewish population of England and Wales in 2011 – has been successfully overcome, and could be applied to other minority groups in the UK or elsewhere.

Table 5.10 Comparison of characteristics of Jewish and other residents

Class	Tag	Characteristic	Jewish Residents	All other residents
A	*Footloose cosmopolitan professionals*	Age 65 and over	20%	10%
		Self-employed	32%	18%
		Degree qualified	62%	46%
B	*Blue-collar and student urbanites*	Age 65 and over	23%	13%
		Single-person households	43%	33%
C	*Very young deprived traditionalists*	Fertility indicator	7.4	1.6
		Age 15 and under	56%	20%
		Looking after home	46%	14%
		Employed in education	37%	10%
		Married proportion of partnerships	98%	69%
D	*Young fairly comfortable conservatives*	Fertility indicator	4.1	1.5
		Age 15 and under	36%	21%
		UK born	76%	54%
		Home owner	70%	48%
E	*Comfortable educated suburbanites*	Self-employed	33%	18%
		Degree qualified	58%	40%
F	*Affluent home-grown commuters*	Self-employed	34%	19%
		Professional/technical employment	18%	9%
		Two car availability	59%	43%
G	*Comfortable home-grown elders*	Migration indicator	1.0	2.3
		Age 65 and over	38%	18%
		Self-employment	30%	17%
		UK born	90%	83%

It has long been recognised that strictly orthodox Jews form a visually and locationally distinct element within the wider Jewish population of England and Wales (Vulkan and Graham, 2008; Graham, 2013a), and that there is a degree of socio-economic deprivation and attitudinal differences between that grouping and 'mainstream' Jews (Holman and Holman, 2002; Valins, 2003).

The geodemographic assessment presented in this paper is the first to examine the Jewish population of England and Wales in its totality. The classification results are easily distinguishable both geographically and in terms of socio-economic and other characteristics. Indeed, the analysis has demonstrated that the strictly orthodox community can itself be considered as two classes. More importantly, the assessment has shown that there is considerable heterogeneity amongst 'mainstream' Jews. Geographically, there is a clear division between inner urban Jews and suburban/commuter-belt/coastal Jews, with distinct classes within each of these two wider categories. In terms of major demographic characteristics, there is a wide-ranging diversity in fertility levels between the various classes identified – from very

high levels leading to a rapid expansion of the class, to levels that are around 50% of replacement levels. The latter class (Class A - Footloose cosmopolitan professionals) appears to be sustained by extensive in-migration of young adults. Conversely, the below-replacement fertility of Class G - Comfortable home-grown elders is compounded by out-migration of young adults. The population pyramid for Anglo-Jewry as a whole (see Figure 5.4) indicates a high level of stability; however the underlying analysis indicates that this is merely co-incidental, and masks patterns of significant expansion and contraction in different geodemographic classes that, by chance and at the present time, happen to cancel each other out overall.

This paper has demonstrated that a geodemographic assessment of a sub-population is possible, even for a grouping that makes up only 0.5% of the national population and is geographically very unevenly distributed. In technical terms the paper has addressed the challenges of outliers and local minima through the development of a methodology that carefully combines both hierarchical and optimising clustering techniques. Substantively, the paper has shown that there are wide socio-economic differences within Anglo-Jewry, but that there is a strong degree of spatial clustering too. The analysis presented here both confirms and contradicts Tobler's *First Law of Geography*, which states that 'everything is related to everything else, but near things are more related than those far apart' (Tobler, 1970, p236). Certainly, the assessment shows that there is a high level of homogeneity at a local level – many adjoining analysis areas fall into the same class even though the Jewish population of the analysis units is, on average, fewer than 600. It is also true that some localities at a distance from each other present quite different socio-economic and other characteristics. However (contrary to the 'law'), it is possible to find localities/populations in widely separated parts of the country that share characteristics and class allocation.

Spielman and Thill (2008) reached an almost identical conclusion as regards Tobler's First Law and the spatial distribution of population characteristics in their study of New York. Their technique did not use geodemographic assessment in a traditional form; instead they combined a topographic representation of the distribution of cases with their locational positioning in a Kohonen Self-Organising

Map algorithm (SOM) [8] (Kohonen, 2001; Yan and Thill, 2009; Openshaw and Openshaw, 1997). Nevertheless, the type of clustering patterns found in the current study's UK sub-population are also found in studies of the whole population of areas.

Carrying out a geodemographic analysis should not be seen as an end in itself. However, 'identifying geographical patterns or trends within societies is an important step towards understanding the processes and phenomena that give rise to those patterns in the first place' (Harris, Sleight, and Webber, 2005, p14). The analysis described in this paper could thus form an essential foundation to a more extensive geo-social or demographic assessment/projection of Anglo-Jewry (*as set out in the remainder of this thesis*), and it could be applied to other minority groups and in other localities.

[8] Whilst Spielman and Thill's (2008) approach could have been used to form, for example, a 7-class classification of the New York area instead, they allocated the 2217 census tracts to 1350 'buckets' (p114). On the SOM, similar buckets are located in close proximity, allowing the user to group (classify) census tracts through arbitrary or regular sub-division of the SOM, which is linked to a topographic representation of the tract locations.

6. Heterogeneity and spatial distribution of small groups – looking beyond indices of distribution

The previous chapter, whilst concentrating on determining the extent of heterogeneity within the Anglo-Jewish community, also accounted for the uneven physical distribution of the Jewish population of England and Wales. In doing so, it set out a clear picture of the spatial distribution of the group, identifying large areas of the country where few Jewish residents are found. In terms of those areas where the majority of Jewish residents live, the identification of analysis areas made up of single LSOAs, single MSOAs, and groups of MSOAs, indicates in which areas Jews are present as relatively high, medium, and low proportions of the population at large, respectively. This chapter focuses on the issue of spatial distribution, and analyses the position for the Jewish group in parallel with three other small groups (addressing the research aim of understanding whether the Jewish group presents features that are similar to or distinct from other groups). In contrast to Chapter 5, which considered only data relating to 2011, in this chapter the focus is on change over time (another of the research aims of the thesis), and examines information from both the 2001 and 2011 censuses.

Unlike the previous chapter, this chapter seeks to quantify spatial distribution, but raises the question of the appropriateness of using a distribution index. However it returns to a theme of Chapter 5 – heterogeneity within groups. In this case it investigates whether there is a case for taking variation in characteristics within a group into account if trajectories of spatial distribution are to be understood.

The text included in this chapter forms the basis for a future paper which will be submitted for peer review in due course.

Abstract

Population researchers have contributed to the debate on minority group distribution by providing objective analysis. Whilst quantitative assessments provide useful descriptions of the situations found, they rarely provide any explanation for the underlying trajectory. Using England and Wales as a test bed, and looking at four small sub-populations, this paper asks whether the determinants of spatial distribution are too complex to be addressed using standard indices of distribution,

and whether heterogeneity between and within the groups means that a more detailed exploration of the data is required if a clearer understanding of changes in spatial distribution over time is to be achieved. It demonstrates the impact of scale on conclusions reached, and concludes that heterogeneity within groups, complex interaction between natural change and migration, and between suburbanisation and a desire for group congregation, mean that explanations for the trajectory of distribution require examination of data at a detailed level.

6.1 Introduction

The spatial distribution of minority groups, and the impact of immigration and group segregation on stability of society and continuing disadvantage, are topics that are widely debated in academic and political circles in many parts of the world. One of the major contributions that population geographers and other social scientists make is to provide an objective analysis of the extensive amount of data that are available on this subject, and a firm and objective foundation for the wider discussion of these matters (for example, Rugh and Massey, 2010; Ãslund and Skans, 2010; Shon, 2010; Jivraj and Simpson, 2015a). Frequently, this takes the form of assessing and quantifying the pattern of distribution and its change over time through the use of a wide variety of indices of distribution or other quantified, rule-based, approaches.

Importantly, although possible explanations for distribution changes are put forward, this is often without direct linkage to the analysis undertaken or underlying theories of spatial distribution. As Catney puts it 'The Index of Dissimilarity does not explain *why* segregation might persist or change over time, but with careful interpretation it can hint at these processes.' (2016a, p1705).

6.2 Aims of this paper

A closer examination of the variation in the characteristics of minority groups may improve the explanation of change in spatial distribution. It is important that this is better understood since cultural and 'ethnic diversity, which is now a key characteristic of contemporary society in Britain, is an issue of public, policy, political, and academic interest.' (Catney, 2016b, p13).

Using England and Wales as a test bed, this paper seeks to broaden the discussion on quantifying and understanding spatial distribution trends by presenting

results beyond solely ethnic group-based analysis and seeking answers to the following questions:

1. How influential is the choice of geographic scale at which the analysis is carried out on the conclusions drawn?
2. Are the determinants of spatial distribution too complex to be determined through the application of a global index?
3. Does traditional theory play any part in explaining spatial distribution?
4. Is migration or natural change a more important driver of change in spatial distribution over time?
5. Does heterogeneity within the groups mean that a more detailed exploration of the data is required if a clearer understanding of spatial distribution trajectory is to be achieved, and what would such an investigation tell us?

6.3 Theoretical background

Questions about the spatial distribution of minority populations and how this might change over time are not new. As long ago as 1926, Park recognised that change in residential location was associated with levels of education, employment and income (Park, 1926), with Gordon (1964) defining various social/cultural levels of assimilation that he believed represented a trajectory along which minority groups might travel. Twenty years later Massey (1985, p316) set out to develop 'a modern theory of ethnic residential segregation', under which immigrant groups would initially form concentrations, but would gradually disperse into the wider community as their socio-economic circumstances improved. This approach was later criticised for 'assuming a clear, sequential adaptation of migrants into clearly defined and static host societies' (Nagel, 2009, p400), and focusing measures of distributional 'improvement' for groups on their proximity to white residents (Wright, Ellis, and Parks, 2005). These criticisms reflect the era in which the theory was originally developed. However, in a faster-changing world, the processes are clearly more complex, and enhanced and alternative theories have been developed. Some have used traditional spatial assimilation theory as a starting point; differentiating the attitudes of different generations or sub-groups produced the concept of 'segmented assimilation' (Portes and Zhou, 1993), and 'multiple assimilation' (Iceland and Nelson, 2008), leading to a range of spatial distribution outcomes. Others have

considered alternative approaches, such as transnationalism, which emphasizes the persistent links between migrants and their homelands (Ehrkamp, 2005).

Attention has also been given to the positive aspects of group concentration or congregation (Peach, 1996b; Phillips, Cathy, and Ratcliffe, 2007; Dunn, 1998). The impact of group congregation can, however, be viewed in different ways: as 'protective havens or spatial traps' (Catney, 2016a).

Whilst internal migration is important in bringing about change in spatial distribution of groups it is not the only mechanism in play. Other processes, such as natural change due to births and deaths, can have a larger impact on segregation and neighbourhood mix (Bailey, 2012).

In summary, heterogeneity amongst groups, changing political and social circumstances that impact on individuals' aspirations and expectations, uncertain economic conditions, and changing outlook of later generations may have confounded the simplicity of traditional spatial distribution theory. However, most researchers have found a continuing link, in some form, between socio-economic advancement, cultural preferences and assimilation, and changes in spatial distribution.

6.4 Measuring spatial distribution

Numerous indices have been used to measure various aspects of spatial distribution, with in-depth reviews carried out to reach a consensus on their use (Duncan and Duncan, 1955; Massey and Denton, 1988; Simpson, 2007). The Index of Dissimilarity, *D*, a measure of unevenness, has emerged as the front-runner in terms of frequency of use in publications and its easy interpretation as 'the proportion of a group that would have to move to be distributed through localities like the rest of the population' (Simpson, 2007, p421). That is not to say that it is without weaknesses (Cortese, Falk, and Cohen, 1976; Taeuber and Taeuber, 1976; Winship, 1977; Voas and Williamson, 2000) so care has to be taken in its interpretation. Most importantly, its value is influenced by the spatial units of the data (smaller units tend to increase homogeneity of population and thus lead to increased values of the index). Although this is widely recognised, studies generally report their results for a single geographic scale; the impact of the particular scale chosen on the conclusions drawn from the research is thus unknown.

6.5 Spatial distribution of minority groups and the 2011 census

Turning specifically to the case of England and Wales, what has presentation of information from the 2011 census already told us about minority group spatial distribution change? In terms of headline information, there has been: a material increase in the non-white population of England and Wales since 2001; a notable reduction in the number of white Britons resident in London; an increase in the number of boroughs where the white British, whilst remaining the largest group, constitute less than 50% of the population (Jivraj, 2012; Simpson, 2013, 2015; Jivraj and Simpson, 2015b). At the same time the level of ethnic group segregation has decreased (Catney, 2015). However, using local authority data and *D*, Simpson (2012) has shown that Chinese and Jews increased the unevenness of their distribution since the previous census, and the 2011 unevenness value for the Jewish group was the highest of any of the census ethnic and religion groups.

More detailed quantitative analyses of spatial distribution of ethnic groups, using various distribution indices or area classification formulae, have been provided by Johnston, Poulsen, and Forrest (2013, 2014, 2015), Catney, (2016a, 2016b, 2017), and Harris (2014). An important function of these papers has been to provide an academically rigorous response to public and political (mis)understanding about the level of segregation/separation between various ethnic groups, and whether this is genuinely increasing or reducing.

A number of potential explanations of the patterns found are raised, such as:

- the role of continuing immigration and differing age profiles between groups (Catney, 2017; see also Simpson and Jivraj, 2015);
- the concept of whether the changes arise from a desire to live with others of the same group, or whether choice of schools, a desire to move to the countryside, or simply to move away from less attractive areas is the driving force (Harris, 2014); and
- the role of financial and economic restrictions, ethnic disadvantage in some fields of employment, partly linked to the value of qualifications, and fluency in English (Catney, 2016a).

6.6 This paper's approach

The implication of using global indices is that groups are assumed to be homogeneous. Furthermore, there has been a focus on ethnic group, one aspect of cultural identity (Aspinall, 2000a) with, at the time of writing, no detailed analyses presented for another facet – religion.

This paper uses the particular conclusions about Chinese and Jewish distributions mentioned above (Simpson, 2012) as its starting point. Both Chinese and Jews had a 2001 population of around a quarter of a million people, as did two other clearly defined groups (that is, excluding 'mixed' and 'other' groups) – Sikhs and Bangladeshis (see Table 6.1). To provide comparison with groups whose trajectory seemed more typical, all four groups are examined side by side, using data from the 2001 and 2011 censuses, with the majority white British group used as a benchmark where appropriate. The focus is thus on two groups based on religion, presenting detailed analysis of spatial distribution change for Jews and Sikhs for the first time, and two based on ethnic grouping. These four small cultural groups (which may display a different dynamic to the larger groups that other researchers have examined) have, as described later, quite different demographic and socio-economic characteristics, with a notable variation in their length of material

Table 6.1 Distinct religion and ethnic group categories in the 2001 and 2011 censuses

Group	2001 population	2011 population	2001 to 2011 change
Religion based:			
Buddhist	144,453	248,580	+72%
Jewish	**259,927**	**265,073**	**+2%**
Sikh	**329,358**	**423,345**	**+29%**
Hindu	552,421	817,679	+48%
Muslim	1,546,626	2,720,426	+76%
Christian	37,338,486	33,268,057	-11%
Ethnic Group based:			
Chinese	**226,948**	**393,141**	**+73%**
Bangladeshi	**280,830**	**447,201**	**+59%**
Black African	479,665	989,628	+106%
Black Caribbean	563,843	594,825	+5%
White Irish	641,804	531,087	-17%
Pakistani	714,826	1,124,511	+57%
Indian	1,036,807	1,412,958	+36%
White British	45,533,741	45,134,686	-1%

Source: 2001 census standard table S104; 2011 table DC2201EW (modified by ONS on 26 Feb 2015)

presence in Britain, and levels of recent immigration; they thus provide an interesting and varied basis for the investigation of spatial distribution.

6.7 Application of the Index of Dissimilarity and scale

Prior to exploring the four cultural groups and the changes in their spatial distribution in more detail, the impact of scale on the conclusions produced by *D* is considered. It is already widely understood that choosing a finer geographic scale will increase homogeneity of areas and thus increase the values of *D*; the more important issue, given that published works usually focus on a single scale, is whether the impact of scale is large enough to change overall conclusions.

The results presented by Simpson (2012), for example, were based on 2011 local authority geography – England and Wales divided into 348 units of varying sizes. Census outputs for 2001 and 2011 are built up from output areas (OAs) each accommodating around 300 persons, based on consistency of housing style and tenure. OAs are combined by ONS into LSOAs (average population 1500), and MSOAs (typical population 7800). Only a small minority of each of these areas was redefined by ONS between the two censuses (ONS, 2012d), such that the impact on the calculation of *D* can be ignored.[9]

Calculations for *D* for the groups of interest, based on 2001 and 2011 census outputs at various geographies are presented in Table 6.2. The local authority values are taken from Simpson (2012); the remainder are author calculations and allow for Voas and Williamson's (2000) small value adjustment/correction.

The table demonstrates that there is an important issue of scale in play here, with the direction of movement in unevenness (see the lower section of the table) changing for three of the groups (Chinese, Jewish, and white British), when moving from local authority level to a finer scale. Indeed for the Chinese group the highest

[9] Values of *D* shown in Table 6.2 are based on a common geography for 2001 and 2011 for LSOAs and for MSOAs, making use of 2001 MSOAs/LSOAs, for the 1% of areas that had been split into smaller areas for the 2011 census, and 2011 MSOAs/LSOAs elsewhere (including only 0.4% where boundaries were not identical or near-identical to those used in 2001). Calculations carried out by the author show that the difference between use of 2001 geography for 2001 data and 2011 geography for 2011 data (rather than a 'hybrid' consistent set for both years), alters the third most significant digit in the calculated *D* values by either zero or one.

Table 6.2 Values of the index of dissimilarity for England and Wales

Geography	Bangladeshi	Chinese	Jewish	Sikh	White British
2001 values					
LA	61.0	31.9	62.4	62.9	47.7
MSOA	72.2	41.8	68.7	68.8	53.7
LSOA	76.8	51.5	71.5	72.0	54.9
OA	87.5	73.5	82.3	82.4	56.4
2011 values					
LA	58.4	33.6	63.0	61.4	46.9
MSOA	67.7	42.6	68.3	66.7	53.9
LSOA	70.7	47.8	70.1	69.0	55.1
OA	80.0	60.7	75.6	77.1	56.6
Change between 2001 and 2011					
LA	-2.7	+1.7	+0.6	-1.5	-0.8
MSOA	-4.5	+0.8	-0.4	-2.1	+0.2
LSOA	-6.1	-3.7	-1.4	-3.0	+0.2
OA	-7.5	-12.8	-6.7	-5.3	+0.2

Source: Author calculations using data from 2001 census tables KS006, KS007 and 2011 census tables KS201EW, KS209EW

increase in *D* is replaced with by far the largest reduction in *D* of any of the groups, and both Sikhs and Bangladeshis demonstrate (in 2011) a higher level of unevenness than do Jews.

The answer to the first question raised (are the conclusions affected by scale?) is thus clear – global conclusions about change and degree of unevenness when measured using the Index of Dissimilarity are indeed affected by the geographic scale chosen and, in this particular case, headline conclusions about Chinese and Jewish increasing unevenness and level of unevenness differ at different scales. At the LSOA level, for example, Bangladeshis, Jews, and Sikhs all have (in 2011) similar levels of unevenness, and Chinese are more evenly spread than the white British.

In order to address the other research questions, it is now appropriate to move away from discussion on *D* and attempts to summarise the situation globally, and examine the four small cultural groups in more detail.

6.8 Overview of the four cultural groups

Prior to examining the spatial distribution of the four cultural groups at a detailed level, this section provides an overview of the characteristics of each group. These particular characteristics, all linked to theories of spatial distribution, should

provide us with expectations about the likely distribution and trajectory of distribution of the groups.

In this section, four aspects are considered:

- Longevity of material presence in, and scale of recent immigration to, Britain – which may influence the level of continuing presence in immigrant settlement areas;
- Age profile and thus whether groups might be increasing in presence due to an excess of births over deaths;
- Improvement in socio-economic status – which might be associated with advancement up the property ladder, and relocation to more sought-after areas;
- Inter-marriage – as a marker for cultural assimilation – which some commentators have associated with the post-physical integration period.

Longevity of material presence and recent immigration levels

Questions on ethnic group membership have been asked from the 1991 census onwards and on religion from 2001. Using census data[10] in parallel with research carried out by others — Rees and Butt 2004; Schmool and Cohen 1998; Peach and Gale 2003; Eade, Vamplew, and Peach 1996 — it is possible to gain an appreciation of the duration and rate of growth for these groups over a longer period. Figure 6.1 identifies the general trajectory of population change for each group over the last 80 years; for each group, 100% equals the 2011 census population.

The profile for the Jewish population is clearly in stark contrast to the other groups. Over the last 60 years, the Jewish group's population has gradually fallen from its peak, which was more than 50% higher than the current population, while the other groups have all grown from no more than 5% of their 2011 figures. This confirms that Jews have been present in the UK in significant numbers for a much longer period than the other groups considered here.

The graph can be supplemented by examining information on year of arrival in the UK of those present at the 2011 census by making use of the 2011 Census

[10] published values for religion and ethnic-group categories for 1991/2001 to 2011; profile of China/Hong Kong, and India country of birth data for 1931 to 1961/71.

Microdata Individual Safeguarded Sample files (ONS, 2014b) – a 10% anonymised sample of the England and Wales 2011 census returns – see Table 6.3.

The high proportion of UK-born Jews reflects the profile shown in Figure 6.1, and more than half of the Bangladeshi and Sikh community are UK born. None of these groups is materially affected by international students. The profile for the Chinese group is, however, markedly different, with just under half having arrived since 2001, and with students making up almost half of that element. The majority of students are likely to be transient visitors to the UK, located in key university towns, and the overall impact of such a material proportion of the group having arrived since 2001 on spatial distribution depends on whether they have settled in areas where the Chinese group is already present (Luk, 2008, 2009; Lymperopoulou, 2013).

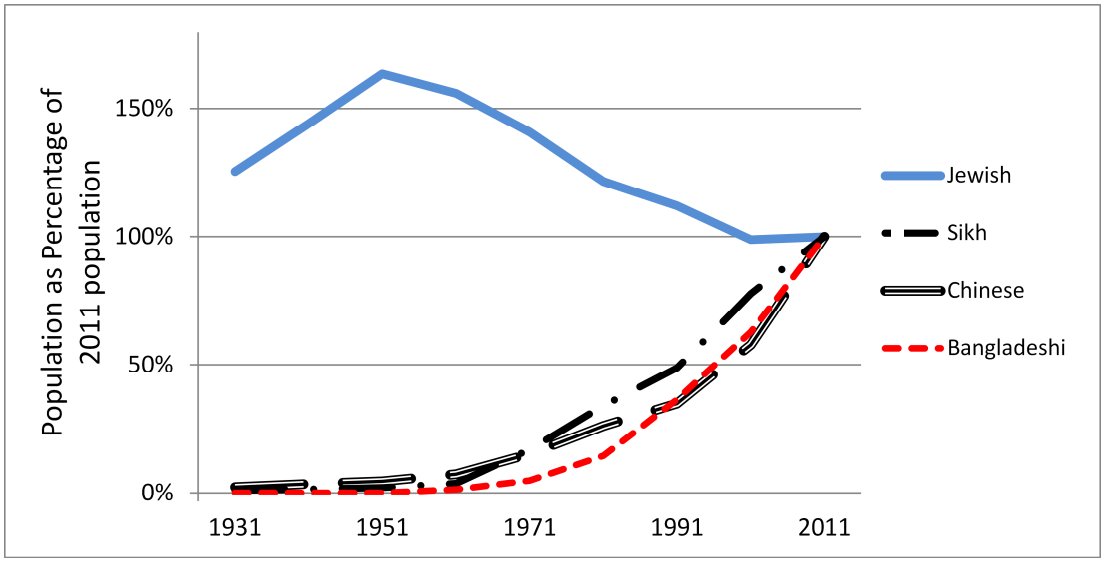

Figure 6.1 Group population profiles 1931-2011 (England and Wales)

Table 6.3 2011 England & Wales usual residents – year of arrival

Group	UK born	Year of arrival in UK						Total	Sample size
		before 1971	1971-1990	1991-2000	2001-2006	2007-11 non-student	2007-11 student		
Bangladeshi	52%	3%	19%	10%	9%	5%	2%	100%	44865
Chinese	24%	5%	15%	11%	16%	9%	20%	100%	39099
Jewish	81%	4%	4%	3%	3%	3%	1%	100%	26394
Sikh	57%	15%	12%	5%	6%	4%	1%	100%	41962

Source: Author analysis from the 2011 Census Microdata Individual Safeguarded Regional and LA files

Traditional theory would lead us to expect that Jews would be highly dispersed amongst the wider British population, but we already know that this is not the case. However, we might expect to find that their physical location is away from the settlement areas occupied a century ago.

Age profile

Table 6.4 summarises a number of characteristics taken from 2011 census outputs, including information on age profile. The population pyramids (based on the same data source) shown in Figure 6.2 clearly illustrate the different age profiles of the groups. The proportion of the Bangladeshi community aged below 15, at 46%, is twice that of any other group listed here and indicates that the population is expanding at a fast rate through natural change (see also Simpson and Jivraj, 2015). The Jewish group has a larger proportion of its population in the aged 65 and over band than all of the other groups, and has the potential for shrinkage through natural change. The absence of a significant elderly presence in the Sikh and Chinese communities will result in an excess of births over deaths. We should expect to see these natural changes reflected in changing spatial density.

Socio-economic status

Table 6.4 also provides information on areas of employment, with noticeable variation between the groups. The roles played in these areas of employment are of more importance as regards assessing socio-economic progress. Chinese and Jews accommodate a high proportion of managerial and professional positions — National Statistics Socio-Economic Classification (NS-SeC) 1 and 2 — with Bangladeshis and Sikhs including lower proportions than do the white British. Despite a low proportion of managerial and professional positions in the Sikh group, that group exhibits the highest levels of home and two-car ownership of all groups. Based on the high proportions in managerial and professional employment, and/or home and car ownership levels for the Jewish and Sikh groups, we might expect them to be located in more sought after residential areas than members of the other cultural groups.

The index of multiple deprivation provides an alternative way of considering the economic/financial link with location of residence. The Department for Communities and Local Government measures each LSOA in terms of its level of

Table 6.4 Demographic, cultural and socio-economic characteristics (2011 E&W)

	England and Wales Usual Residents	White British	Bangla-deshi	Chinese	Jewish	Sikh
	Proportion (x 100)					
Demography / Cultural background (of all usual residents in group)						
Male	49.2	49.1	51.6	47.3	48.7	50.6
Age 0 to 15	18.9	22.7	46.1	16.1	20.1	20.5
Age 65 and over	16.4	18.8	3.7	5.0	21.0	8.3
United Kingdom born	86.6	97.9	51.9	23.7	81.1	56.6
With only non-British identity	7.3	0.3	15.5	48.0	8.6	16.8
Economic activity						
Self-employed (of all in employment)	15.2	15.0	15.0	18.5	29.0	17.5
Retired (ratio to number aged 65 or more)	105.3	105.9	98.5	128.4	85.0	105.6
All students (ratio to number of 16 to 64 year olds)	10.5	8.0	17.8	32.5	13.1	13.8
Areas of employment (of those in employment)						
Manufacturing	8.9	9.4	3.2	4.2	3.8	9.9
Wholesale and retail trade; repair of motor vehicles	15.9	16.1	18.8	12.0	14.1	22.2
Transport and storage	4.9	4.7	7.2	2.3	2.7	8.5
Accommodation and food service activities	5.6	4.7	27.3	26.7	2.8	5.2
Professional, scientific and technical activities	6.6	6.5	4.3	10.7	15.9	5.8
Education	9.9	10.2	9.2	8.2	13.3	7.1
Human health and social work activities	12.5	12.2	8.8	10.1	11.2	9.8
Social/Educational						
Level 4 (degree) qualified (of all over 16 year olds)	27.2	25.7	19.8	42.9	42.1	30.1
NS-SeC Class 1 and 2 (professional/ managerial) of all in Classes 1 to 7	35.4	35.1	24.7	43.6	54.6	31.8
Households with room shortage (of all households)	8.5	6.9	41.4	25.5	8.0	13.7
Households living in owned or shared ownership accommodation (of all h/holds)	64.3	68.1	43.1	50.8	73.3	78.1
Households with 2 or more cars or vans available (of all households)	32.2	34.2	18.3	21.5	35.7	46.6

Source: Author calculation using 2011 census tables DC2101EW, LC2107EW, DC2202EW, DC2204EW, DC2205EW, DC2207EW, LC2404EWls, LC2405EWls, DC4202EW, LC4204EW, LC4207EW, LC4208EW, LC5204EW, DC5209EWla, DC6201EW, LC6205EW, DC6206EW, LC6207EW, DC6216EW, DC6217EW.

deprivation using a range of measures associated with income, employment, health and disability, education skills and training, barriers to housing and other services, crime and living environment (Noble et al, 2006; DCLG, 2011). Based on the deprivation score, the LSOAs are ranked, and it is customary to categorise the LSOAs based on the decile into which they fall (decile 1, most deprived, to decile 10, least deprived). Unfortunately, the criteria used to measure deprivation differ

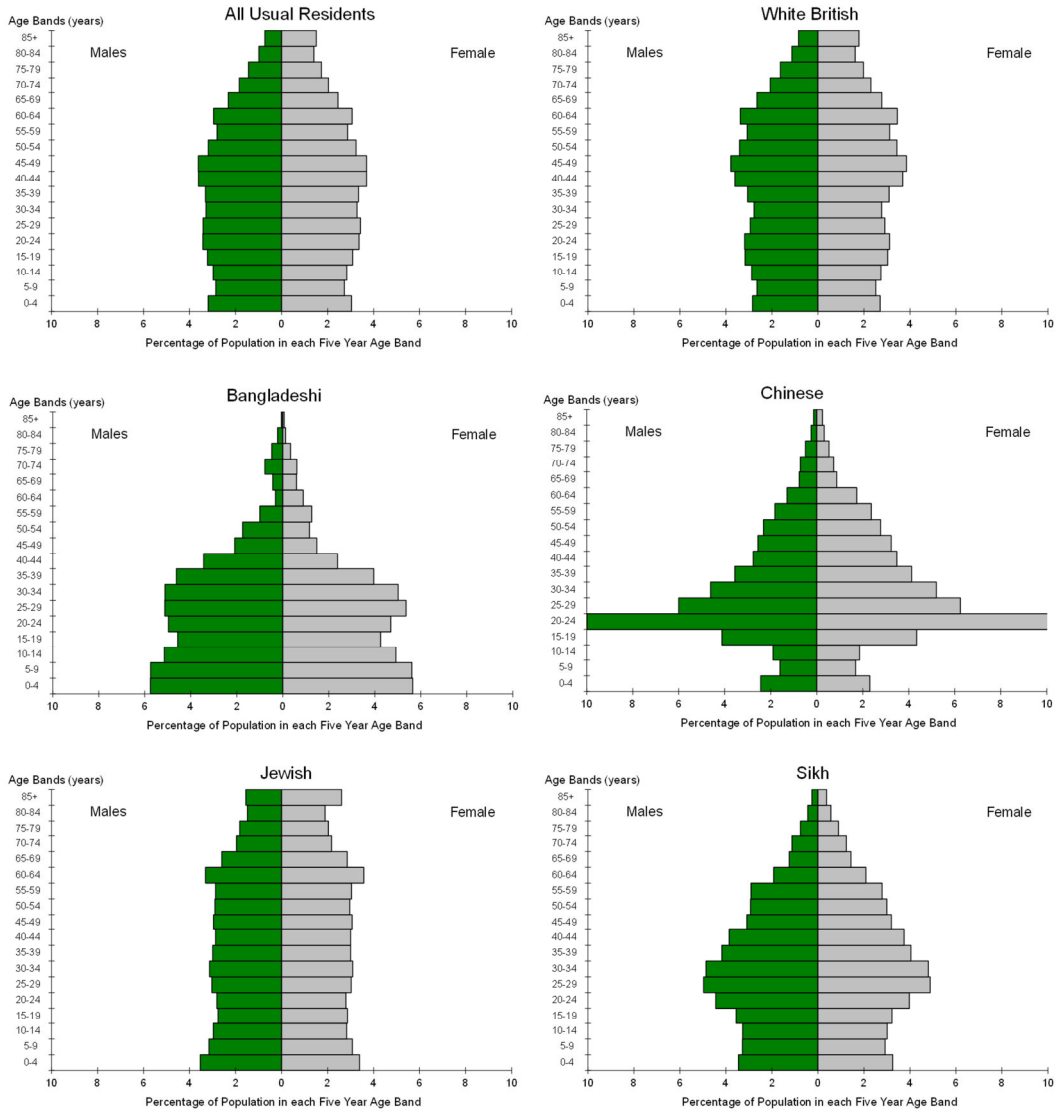

Figure 6.2 Group population pyramids, England and Wales, 2011

between England and Wales, so the two set of measurements cannot be combined. The analysis presented here only considers England; however over 97% of England and Wales' Bangladeshis, Jews, and Sikhs live in England (as do over 96% of Chinese, and 93% of white British). The government updates the assessment every three or four years (and therefore LSOAs may move between deciles). However to provide a fixed base to monitor change in spatial distribution, the 2010 index (based on data collected between the 2001 and 2011 censuses) has been used here.

Figure 6.3 indicates the proportion of the 2001 population of each of the small cultural groups that were resident in LSOAs falling into each decile of the index. It is important to note that the index relates to the mean status of the totality of residents of the LSOA – not just members of the groups under examination.

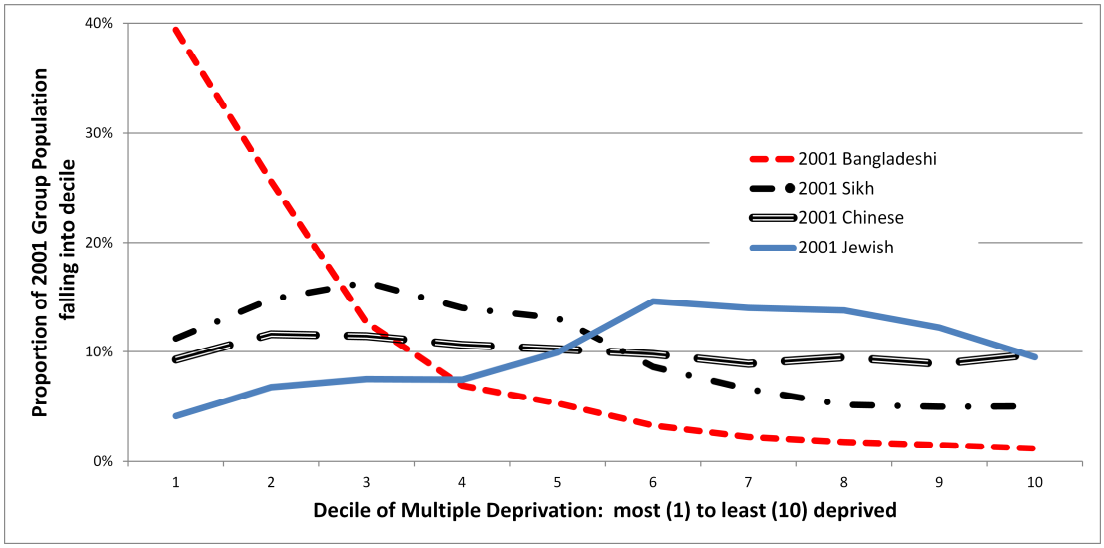

Figure 6.3 Allocation of 2001 group population to IMD deciles

Although LSOAs are designed to be as homogenous as practical in terms of residential mix, there will be some variability within each LSOA.

The graph shows that, in 2001, the Bangladeshi population was most concentrated in the most deprived deciles, with below average proportions in deciles 4 to 10. The Sikh group is over-represented in deciles 1 to 5, and under-represented in deciles 6-10 though to a much less strong degree. The Chinese group is evenly spread, with the Jewish group demonstrating a mirror-image of the Sikh pattern. Figure 6.4 shows the percentage point change in split between deciles that has occurred to the population of each group between 2001 and 2011, to allow a link between social advancement and spatial distribution to be investigated.

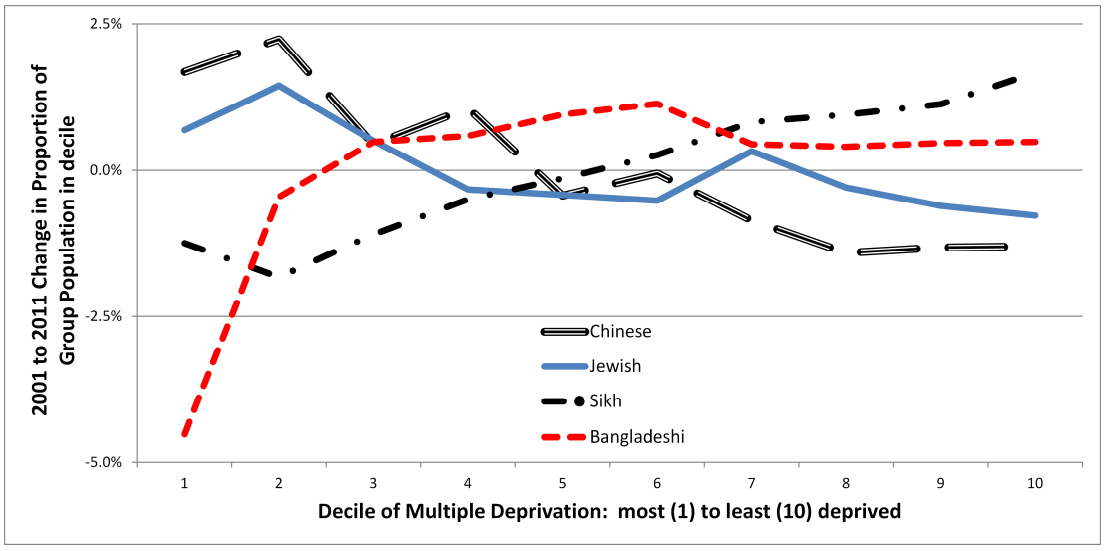

Figure 6.4 Percentage point change in IMD decile 2001-2011

Both the Bangladeshi and Sikh groups have seen a reduction in the proportion of their populations resident in the most deprived deciles, that is, a pattern of continuing socio-economic advancement; though the shape of the curve, and pivot points of zero change are differently located. Conversely, the Chinese and Jewish lines show the opposite trend. The Chinese trend is probably explained through the very large increase in student numbers over the decade, given that in most major cities, student residences tend to be found in less-affluent areas. The Jewish line is less easily explained – it may suggest that the Jewish group's socio-economic progress over the last century has now plateaued and is in a period of fluctuation, or simply reflects the marked difference in age profiles and fertility levels in different parts of the community (Staetsky and Boyd, 2015).

The question though is whether the level of change demonstrated here is sufficient to be reflected in a noticeable pattern of geographic change on the ground.

Inter-marriage

Table 6.5 summarises the census information available on the cultural identity of spouses[11] and other partners of members of the groups under examination who live in partnerships. Note that for the groups based on religion, relationships where the partner did not respond to the question on religion are excluded (an equivalent consideration for ethnic group does not apply as ONS imputes an ethnic group for non-respondents).

It is clear that the Bangladeshi and Sikh groups are overwhelmingly endogamous, whereas there is a material level of inter-marriage for the Chinese and Jewish groups. Gordon's (1964) perspective on this is that these higher levels would only be achieved if the relevant groups were residentially dispersed amongst the wider population, and had become culturally assimilated (see also Waters and Jiménez, 2005).

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[11] Note that 2011 data include same-sex civil partnerships in the married column. Note also that ONS has not released information for the Sikh group for 2011, so the table shows data for 2001 for that group. Data for 2001 does exist for the other three groups – it shows that there has been no material change in out-marriage for the Bangladeshi and Jewish groups since 2001, but the proportion of Chinese with non-Chinese spouses has increased by 5% from 22%; the Sikh proportion for 2011 can be expected to be similar to 2001.

Table 6.5 Proportion of partnered group members with non-group partners

		Married			Cohabiting		All partnerships		
2011		total	non-group partner		total	non-group partner	total	non-group partner	
Bangla-	Men	74,974	4,652	6%	4,243	1,781	79,217	6,433	8%
Deshi	Women	74,380	4,062	5%	3,454	1,206	77,834	5,268	7%
	Total	149,354	8,714	**6%**	7,697	2,987	157,051	11,701	**7%**
Chinese	Men	51,936	8,365	16%	11,203	4,471	63,139	12,836	20%
	Women	68,046	24,479	36%	14,587	8,133	82,633	32,612	39%
	Total	119,982	32,844	**27%**	25,790	12,604	145,772	45,448	**31%**
Jewish	Men	54,125	12,364	23%	6,190	4,202	60,315	16,566	27%
	Women	53,609	11,876	22%	6,029	4,109	59,638	15,985	27%
	Total	107,734	24,240	**22%**	12,219	8,311	119,953	32,551	**27%**
Sikh	Men	71,170	3,658	5%	2,682	1,481	73,852	5,139	7%
(2001	Women	70,437	2,925	4%	2,274	1,073	72,711	3,998	5%
data)	Total	141,607	6,583	**5%**	4,956	2,554	146,563	9,137	**6%**

Source: 2001 tables C0400, C0629; 2011 tables CT0458,CT0459, CT0460, CT0461, and 2011 un-numbered tables from 'What does the 2011 Census tell us about inter-ethnic relationships': http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-365449

In reality, the degree of intermarriage may involve more than residential proximity between the groups and individual concerned, so to what extent is this reflected in the spatial distribution of these groups?

6.9 Group spatial distribution in 2011 and change from 2001 to 2011

Having set out some of the overall characteristics that may have an influence on shaping the spatial distribution of the groups, their geographic distribution and trajectories are examined in this section. Whenever census data (particularly for small groups) are being analysed spatially, there is always a balance to be struck between data accuracy and quality, and homogeneity of areas being considered. LSOA geography has been selected, striking a balance between small numbers and non-disclosure adjustments affecting OA data, and the potential for MSOA areas to mask within-area variation.

LSOAs ranked by the population of the group under examination can be plotted, and contiguous agglomerations identified. Agglomerations that each include at least 1% of the group's total England and Wales population have been listed in Table 6.6. Where there is a strong student presence in an agglomeration, a figure excluding students, approximating to the 'permanent' group presence in the area, is also shown in the table.

There is a marked similarity in the hierarchy of agglomerations for the Bangladeshi, Jewish, and Sikh groups – one large moderately dense agglomeration in

Table 6.6 Group agglomerations and population (2011)

Group	Location of agglomeration (and group population in thousands including / excluding students*) In London area	Elsewhere in England and Wales
Bangladeshi	Tower Hamlets, Newham, Redbridge, & Barking (148); Camden & Islington W (13); Haringey (5)	Birmingham & West Bromwich (36); Oldham (16); Luton (13); Bradford (7); Walsall (6); Manchester (6)
Chinese	Westminster, Camden, Islington, & Hackney (22 / 14); Southwark, Lewisham, Greenwich, & Lambeth (19 / 14); Tower Hamlets & Newham (10 / 8); Barnet (9 / 7)	Manchester & Salford (13 / 7); Birmingham (7 / 3); Liverpool (5 / 2)
Jewish	Barnet, Hertsmere, Harrow, Camden and environs (118); Hackney & Haringey SE (17); Redbridge & Epping Forest (14)	Bury, Salford & Manchester N (18); Leeds (5); Trafford, Stockport, Manchester S, & Cheshire East (5); Gateshead (3/ 2); Brighton (2.6)
Sikh	Ealing, Hounslow, Hillingdon, Slough & environs (90); Redbridge, Newham, Barking, & Epping Forest (27); Bexley & Greenwich (6)	Sandwell, Birmingham, Walsall, Wolverhampton and environs (98); Leicester, Oadby, & Blaby (21); Coventry & Nuneaton (18); Gravesham & Dartford (10); Derby & S Derbys (9); Warwick (5); Leeds (5); Pudsey & Bradford E (5)

* shown only if students make up more than 15% of population

the London area, which is home to a large proportion of the total England and Wales population (noting that the Sikh community has a second equally large congregation in the West Midlands); one or two more moderately sized groupings elsewhere in the London area; one or two significant communities outside of London (Birmingham for Bangladeshis, North Manchester area for Jews; Leicester and Coventry for Sikhs), and then a scattering of smaller agglomerations. Given the long period of establishment of the Jewish group in Britain, the level of congregation of that group is exceptionally high compared to what might be expected from traditional theory, though this type of pattern for Jewish communities (in the UK and elsewhere) has been recognised for a long time (Massarik and Chenkin, 1973; Newman, 1985; Waterman and Kosmin, 1987; Kosmin et al, 1991; Kotler-Berkowitz et al, 2004).

The Jewish group is predominantly focused in outer suburban areas and the small town/partly-rural hinterland beyond the suburban limit, with no material presence in the original settlement areas of, for example, the 'east end' of London and central Manchester (Williams, 1990; Freedman, 1992; Endelman, 2002). The Sikh group follows a generally similar pattern, but with a continuing presence in inner suburbs in some of the West Midlands authorities, and in the original settlement area in Ealing (London). The Bangladeshi group is very strongly focused

in the Tower Hamlets area of east London (that is, the same settlement area occupied by Jews a century earlier), and adjoining Newham.

The pattern for the Chinese group looks quite different. There are no large area/large population agglomerations, and the student element of agglomerations is very significant, particularly outside of London, where the focus is frequently on the fringe of the inner areas with extensions into the outer suburbs; see Luk (2009) for a more extensive discourse on the distribution of Chinese. There is a much greater scattering of small pockets of Chinese than seen for other groups; Luk (2008) makes reference to Chinese immigrants working in the catering trade deliberately choosing to move away from traditional 'Chinatown' areas in order to expand the market and avoid creating an over-supply of Chinese cuisine in a concentrated area.

Prior to examining spatial patterns of change for 2001 to 2011, an overview of change in England and Wales is provided. Figure 6.5 presents a diagrammatic summary of change. It ranks the LSOAs by the proportion of a group's overall population falling into each LSOA, and data for 2001 and 2011 are shown on the same graph, so that the change in pattern can be seen.

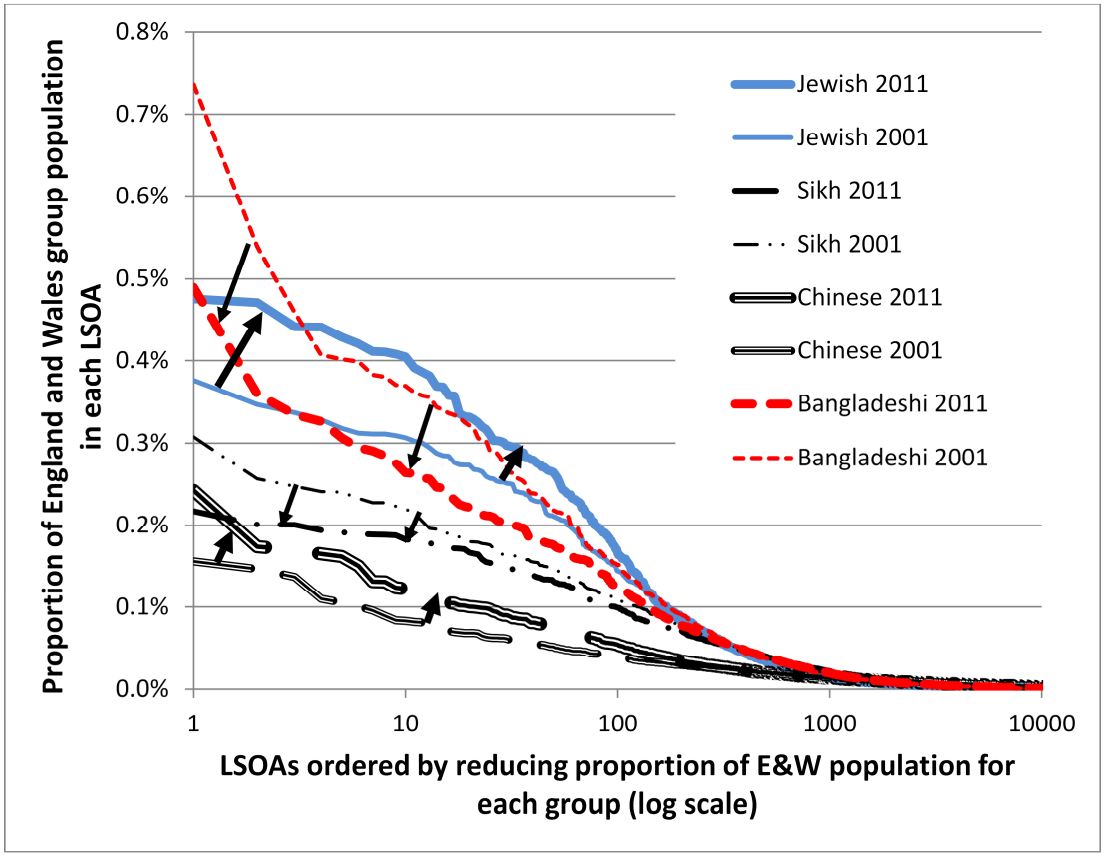

Figure 6.5 Proportion of group population in each LSOA 2001 and 2011

It shows that a greater proportion of Jews and Chinese can be found in LSOAs where they are most populous in 2011 than was the case in 2001, with the reverse being true for Bangladeshis and Sikhs. An alternative presentation for this information is to match the 2001 and 2011 geographies and rank each LSOA by the change in proportion of the LSOAs population that belongs to the group under examination. Figure 6.6 shows that the proportion of LSOAs in which there is a material change in proportion is quite small – there are over 34,000 LSOAs, but the graph shows that material change is limited to around 400 at each end of the spectrum. It is surprising that this is the case given the very large growth in some of these groups between the 2001 and 2011 censuses (as set out in Table 6.1) – the shape of the graph and the number of LSOAs with a noticeably increased population share belonging to the group is not greatly dissimilar for Bangladeshis and Jews despite the former's population having grown by 59% and the latter a negligible 2%.

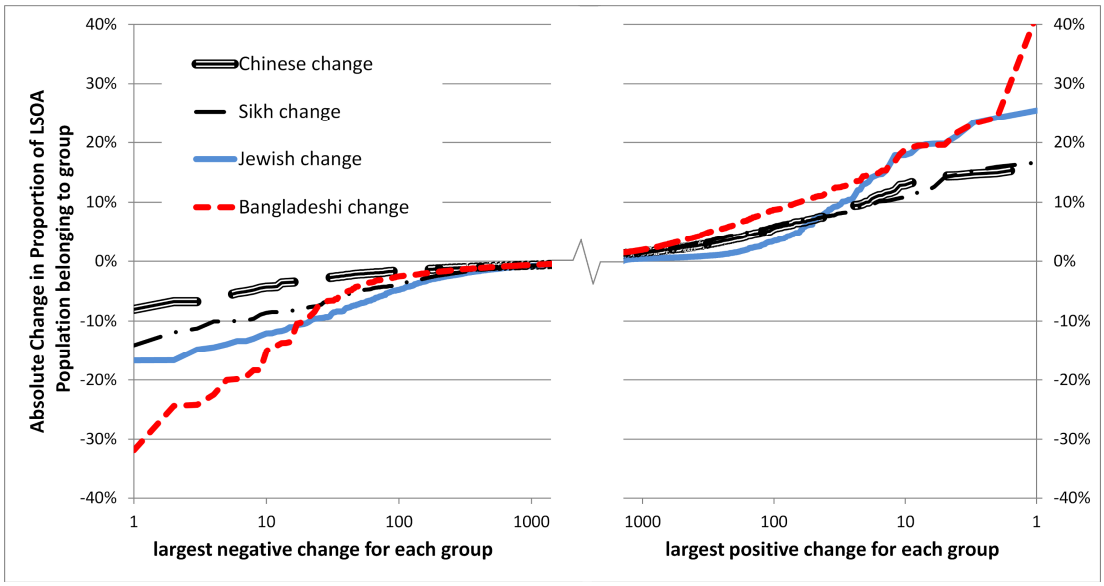

Figure 6.6 LSOAs with largest changes in group population share 2001 to 2011

So where have changes taken place? A mapping exercise to display spatial distribution and change has been carried out, and extracts of England and Wales maps showing the London area are shown in Figure 6.7.

The pattern of change between 2001 and 2011 (as with the actual distribution) shows a remarkable degree of similarity for the Bangladeshi, Jewish and Sikh groups. In terms of the principal focus of the Bangladeshi group in east London, there is a reduced concentration in parts of the most densely populated area; an increase in congregation in a central part of the agglomeration, and a noticeable extension into more suburban areas that were not part of the 2001 'heartland'. There

is thus both a refocusing within the main area of settlement, and a strong movement into 'new' areas outwards from the centre of London (suburbanisation). In addition this is combined with a noticeable loss of population share in the smaller London communities and scattered areas elsewhere. The Jewish and Sikh groups repeat this pattern, though in those cases the extension is into semi-rural areas and might be better described as counter-urbanisation rather than suburbanisation.

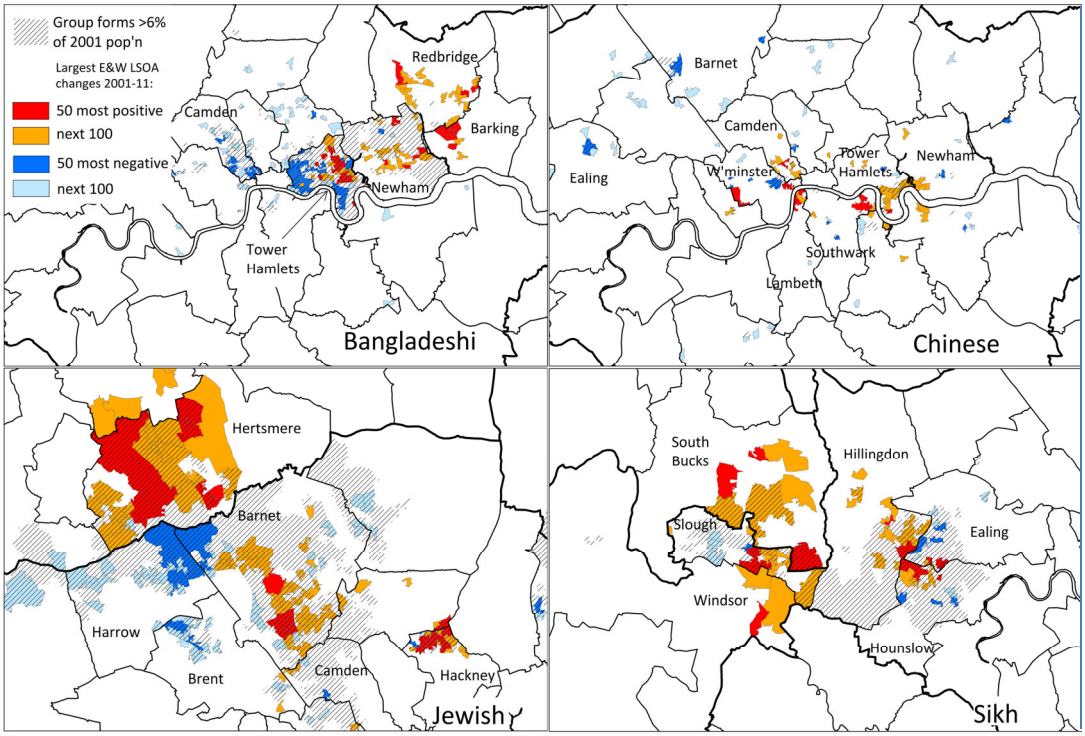

Figure 6.7 Change in distribution 2001 to 2011 at LSOA level

There is no noticeable suburbanisation pattern for the Chinese community. Insofar as the London area is concerned there is a refocusing into two inner city areas, with a loss in group proportion in almost every small pocket across the rest of the London area — almost a centralisation process, potentially distorted through the dominance of the impact of students in some areas. Indeed, the student impact in provincial areas is much more apparent — with strong growth in university/student areas of the major cities, and (as in London) a loss in proportion in small suburban clusters.

Qualitatively therefore, some clear patterns of change can be observed, but can a closer investigation of the characteristics of shrinking and expanding areas provide a clearer explanation of these changes? That is, does heterogeneity within

the groups help us to understand the patterns in a better way than a focus on global indices or overarching terms such as suburbanisation?

Table 6.7 provides an overview of the characteristics of areas that have had an increase in group proportion over the 10 year period, and those where there has been a reduction. It sets out a few characteristics for each group, based on the 400 LSOAs that have seen the greatest increase or reduction in group share of population. To assist with responding to question 4 on drivers of change, the table indicates whether migration (denoted as 'mig') or natural change ('nat') is the greater source of population change for the group, based on comparing the 2001 and 2011 age profiles (Ballard, 2004).

There are some common characteristics for all four groups: losing areas have a higher proportion of people with poor health than gaining areas and (not shown in the table) this disparity has increased over the 10 year period. The implication of this is that people with poorer health are less likely to move home and get 'left behind' in areas of group shrinkage (see Darlington, Norman, and Gould, 2015, for a discussion on the relationship between health and internal migration).

For three of the groups, areas of growth have a higher proportion of 0-15 year olds and a lower proportion of those aged 75 or above than do contracting areas; again (not shown in the table) the disparity has increased in the intercensal period. As might be expected, areas with an increasing group proportion benefit from positive natural change (excess of births over deaths), whereas the opposite situation applies to shrinking areas, though for most groups migration (whether international or internal) has a larger impact on the outcome. The Chinese figures are heavily influenced by the very high student presence in growth areas (71%); nevertheless the small levels of natural change are also positive for growth areas and negative for shrinking areas.

There is a marked difference in population density between the groups of LSOAs for Sikhs – reflecting the urban locations for the shrinking areas and the suburban expanding localities. There is no differential for the (suburban) Jewish group, but the Bangladeshi figures reflect the very dense urban locality of the contracting areas and the more typical urban value for expanding areas. It is only the Sikh areas that show a marked difference between the average decile of deprivation in which the groups of LSOAs lie – with the growth areas on average three deciles

Table 6.7 Characteristics of 400 LSOAs with highest gain and loss of group share

		Group Proportion of Population			Direction and main	Area summary		Group characteristics (proportion of 2011 area group population)								
Group	LSOAs in group	**in 2001**	**in 2011**	**10 yr change**	source of group pop'n change	Average IMD decile	Median Pop'n density per Ha	Aged 0-15	Aged 75 or above	Born in UK	with poor health	emp-loyed (of over 16s)	students (of over 16s)	degree holders (of over 16s)	living in owned home	living with over-crow-ding
Bangladeshi group																
largest gain of share	400	**9.3%**	**16.8%**	**7.4%**	+ (mig)	3	86	38%	1%	53%	17%	43%	19%	29%	46%	46%
largest loss of share	400	**10.2%**	**7.2%**	**-3.0%**	- (mig)	3	122	32%	2%	52%	21%	40%	18%	24%	27%	56%
Chinese group																
largest gain of share	400	**2.3%**	**7.4%**	**5.1%**	+ (mig)	4	71	4%	1%	11%	5%	25%	71%	46%	16%	30%
largest loss of share	400	**2.9%**	**1.4%**	**-1.5%**	- (mig)	5	48	11%	4%	24%	13%	48%	32%	51%	42%	22%
Jewish group																
largest gain of share	400	**9.7%**	**13.1%**	**3.3%**	+ (nat)	6	54	33%	7%	81%	11%	60%	11%	38%	68%	2%
largest loss of share	400	**11.0%**	**7.0%**	**-4.0%**	- (mig)	6	54	13%	20%	85%	23%	53%	7%	38%	82%	3%
Sikh group																
largest gain of share	400	**7.6%**	**12.6%**	**5.0%**	+ (mig)	6	42	23%	3%	58%	15%	66%	12%	30%	88%	3%
largest loss of share	400	**11.6%**	**8.1%**	**-3.5%**	- (mig)	3	81	17%	5%	47%	22%	57%	11%	23%	81%	5%

Table 6.8 Characteristics of increasing and reducing share areas

Group Location	LSOAs in Area	Group proportion of population			Direction and main source of group pop'n change	Area summary		Group characteristics (proportion of 2011 area group population)								
		in 2001	**in 2011**	**10 yr change**		Average IMD decile	Population density per Ha	Aged 0-15	Aged 75 or above	Born in UK	with poor health	employed (of over 16s)	students (of over 16s)	degree holders (of over 16s)	living in owned home	living with over-crowding
Bangladeshi increasing areas																
Tower Hamlets (east)	27	**24.8%**	**35.6%**	**10.8%**	+ (nat)	2	123	39%	1%	52%	18%	41%	18%	26%	14%	61%
Barking	23	**4.3%**	**14.1%**	**9.7%**	+ (mig)	3	90	32%	1%	51%	15%	51%	20%	41%	68%	41%
Newham	41	**6.1%**	**13.5%**	**7.4%**	+ (mig)	2	117	34%	1%	43%	16%	50%	29%	41%	37%	57%
Redbridge	63	**1.9%**	**8.3%**	**6.5%**	+ (mig)	5	72	33%	1%	52%	14%	52%	17%	47%	74%	28%
Bangladeshi reducing areas																
Camden	29	**12.6%**	**9.1%**	**-3.5%**	- (mig)	4	105	34%	3%	52%	25%	40%	15%	21%	10%	64%
Tower Hamlets (west)	41	**41.9%**	**30.6%**	**-11.2%**	- (mig)	2	139	32%	2%	52%	22%	38%	17%	23%	20%	63%
Chinese increasing areas																
Newcastle	13	**2.7%**	**9.9%**	**7.2%**	+ (mig)	4	38	2%	2%	6%	6%	15%	80%	44%	12%	31%
Leicester	12	**2.3%**	**8.7%**	**6.4%**	+ (mig)	4	61	1%	0%	7%	3%	14%	85%	42%	13%	36%
Southwark	14	**2.7%**	**8.0%**	**5.3%**	+ (mig)	5	92	5%	0%	19%	6%	63%	27%	54%	34%	40%
Chinese reducing areas																
Ealing	5	**3.2%**	**1.4%**	**-1.9%**	- (mig)	5	50	9%	5%	29%	15%	63%	7%	67%	76%	17%
Jewish increasing areas																
Salford	13	**33.8%**	**44.3%**	**10.5%**	+ (nat)	4	56	43%	6%	81%	10%	56%	12%	27%	65%	1%
Hackney	28	**21.9%**	**32.1%**	**10.2%**	+ (nat)	2	139	49%	3%	76%	8%	48%	17%	13%	30%	5%
Barnet	39	**31.4%**	**36.4%**	**5.0%**	+ (nat)	7	46	30%	10%	76%	12%	60%	8%	48%	77%	2%
Hertsmere	41	**14.6%**	**18.9%**	**4.2%**	+ (nat)	7	11	25%	6%	92%	10%	70%	7%	41%	91%	1%
Jewish reducing areas																
Brent	32	**7.2%**	**3.2%**	**-4.0%**	- (nat)	5	53	4%	32%	82%	33%	43%	4%	38%	90%	2%
Leeds	14	**20.2%**	**15.0%**	**-5.3%**	- (nat)	8	6	13%	21%	95%	23%	50%	5%	40%	89%	1%
Harrow	27	**26.7%**	**19.6%**	**-7.1%**	- (mig)	7	31	17%	17%	86%	20%	57%	6%	38%	89%	2%
Redbridge	44	**14.6%**	**6.9%**	**-7.7%**	- (mig)	6	40	9%	24%	95%	32%	49%	5%	18%	90%	2%
Sikh increasing areas																
Birmingham (nw) / Walsall	33	**11.7%**	**18.4%**	**6.7%**	+ (mig)	5	24	22%	3%	63%	17%	66%	10%	31%	95%	1%
Slough	30	**6.9%**	**13.3%**	**6.4%**	+ (mig)	6	11	23%	3%	59%	13%	71%	11%	37%	90%	3%
Coventry (south)	10	**7.1%**	**13.0%**	**5.9%**	+ (mig)	9	33	24%	4%	66%	13%	72%	9%	42%	97%	1%
Hillingdon	38	**13.9%**	**19.7%**	**5.8%**	+ (mig)	4	43	21%	3%	44%	16%	62%	13%	26%	74%	7%
Sikh reducing areas																
Newham	15	**8.1%**	**4.9%**	**-3.3%**	- (mig)	2	160	14%	5%	46%	23%	55%	12%	26%	81%	6%
Coventry (north)	23	**13.4%**	**9.6%**	**-3.8%**	- (mig)	2	66	16%	6%	48%	25%	55%	11%	20%	84%	4%
Birmingham (west)	15	**21.9%**	**17.6%**	**-4.4%**	- (mig)	2	67	18%	5%	46%	24%	50%	14%	18%	76%	5%
Derby	14	**14.4%**	**9.3%**	**-5.1%**	- (mig)	3	81	19%	8%	45%	26%	56%	7%	17%	84%	3%

less deprived than the shrinking areas; a figure actually exceeded by the white British group (not shown in the table).

Whilst this summary provides an interesting overview, to address question 5 on heterogeneity, we need to examine whether these patterns apply consistently across the actual localities where reducing and increasing population shares have been found. Table 6.8 summarises the same characteristics, area by area. The areas have been named after the main local authority involved, though they are defined in terms of groups of contiguous LSOAs (annotated in the table) where there is shrinkage or expansion; for reasons of space, only the largest areas are shown.

Shrinking Bangladeshi areas in inner London share many characteristics. Although (like the Bangladeshi residents) half of all residents of these areas are UK born, the Bangladeshi residents have slightly poorer health, and are only half as likely to hold a degree, and are slightly less likely to live in a flat (the norm for these areas) than the population as a whole.

In 2001 and 2011 the more suburban of the Bangladeshi increasing share areas had a lower proportion of 0-15 year olds, higher proportion of people over 50, degree holders, employed persons, and home owners, and less over-crowding than Bangladeshis living in other expanding areas; migration has a more important role in increasing numbers than is the case elsewhere. Indeed, there are differences between areas where natural change has been the larger contributor to expansion. They are generally located in areas of highest deprivation, and where the proportion of 0-15 year olds exceeds 40%, and proportions in employment and good health are lower.

Such is the dominance of the student impact on the Chinese group that only two expanding areas (one is shown in the table) could be located that were not dominated by students, though even in these places students make up a disproportionate element. Most of the student-dominated expanding areas have seen a five- to ten-fold increase in the number of Chinese residents over the decade, and also large increases in the proportion made up of students. Their differentiating characteristic is thus the level of popularity of their universities with (international) Chinese students. And as the Chinese group is relatively scattered, only one small group of 5 LSOAs that encompassed a reducing proportion could be found. An analysis excluding students would add Liverpool to the list of reducing areas and

Manchester to the expanding areas; both clusters are on edge of the central area of northern cities, but their age profiles, level of natural change and direction of migration are quite different.

There are clear differences between some of the expanding Jewish areas. Those with the largest changes in population share in the decade are located in areas of fairly high deprivation, have extremely high proportions of 0-15 year olds, low levels (compared with the Jewish group overall) of older people, low levels of poor health, and generally low levels of degree holders and home ownership; natural change is a more important source of population change than migration. These areas are known to be the home of Britain's strictly orthodox Jewish communities, which demonstrate high level of fertility (Graham, 2013a; Staetsky and Boyd, 2015). The other expanding areas are located in areas of lower deprivation, and whilst they feature above average (rather than very high) proportions of 0-15 year olds and larger proportions of older people than the first three areas, adults in these areas are more likely to be employed, hold a degree, and be home-owners. Unlike the other small cultural groups, for Jews, natural change is a more influential source of population change than migration for all the expanding and most of the contracting areas.

The Sikh analysis includes a number of pairs of closely-located localities between the increasing and reducing areas, primarily in the Midlands, where the reducing area has a high level of deprivation and a higher population density, and the expanding area a lower or much lower level, implying movement by those with improving socio-economic standing from one to the other. The growing areas also benefit from positive natural change reflected in higher proportions of 0-15 year olds, which contribute to the lower level of poor health in the expanding areas.

6.10 Discussion and conclusions

The use of an index to encapsulate the spatial distribution of minority groups is an attractive option. It has the benefit of summarising a complex picture in a single figure and many of the indices have a numerical value that can be explained in readily understood terms. The attractiveness of their use, which has stood the test of time, can however mean that their drawbacks (such as a lack of comparability between studies) can sometimes be overlooked. Whilst the impact of geographic scale (such as variation in the size of census tracts between countries) on their values has long been understood, few studies present results for the same study area and

time at different geographic levels, so the consequence of scale on the conclusions of the research are not known. The analysis presented in this paper shows that, depending on the scale chosen, different conclusions can be drawn; in the example illustrated here, quite different headlines relating to Chinese and Jewish distribution changes would be presented. The conclusion for question 1 (scale) is that, certainly for groups that each constitute about 0.5% of the wider population, summarising spatial distribution through use of the Index of Dissimilarity can lead to different conclusions depending on the geographic scale chosen. Insofar as question 2 (complexity) is concerned, the corollary of this is that the use of *D* is something of a blunt tool, hiding the subtleties and complexities of the underlying position.

Some global characteristics of the groups, linked to traditional theories, have been identified, including some quite distinct differences between the groups. Have these differences been reflected in their spatial distribution? The longevity of the Jewish group's presence in Britain is reflected in its almost complete absence from its areas of original settlement, whereas the Bangladeshi group is still much focused in its settlement areas and the Sikh group maintains a presence in its original locations. The broadly similar scale of clustering found in these three groups means that, contrary to traditional theory, length of presence has not led to a dispersed pattern. Moreover, the link between intermarriage levels (which vary greatly between these three groups) and level of dispersal (which does not) is weak. Socio-economic status (and more specifically, professional and managerial positions) has a link with location of residence, with groups with higher proportions of employment at these levels being found in areas in less deprived IMD deciles. Thus, in response to question 3 (theory), if we review some key elements of traditional theories in the light of this study's findings, we can conclude that, as promulgated, socio-economic progress has led to relocation of groups away from their initial settlement areas towards more sought-after residential localities. However, such moves have not led to widespread dispersal (for three of the groups), nor (for the Jewish group) has intermarriage remained limited due to a lack of residential dispersal.

There are some broad similarities between the groups when areas where the proportion of a group has reduced between 2001 and 2011, and another set of broadly shared characteristics for areas that have expanded. When the analysis explores individual increasing and reducing proportion areas, not only are there

many differences between the cultural groups, but there is much reduced consistency of characteristics within each group. However, there is a degree of consistency insofar as the relatively importance of migration (whether international or internal) and natural change is concerned. Despite the greater presence of older people in the Jewish group compared with the other groups under examination (and its likely negative impact on natural change), positive natural change (rather than migration) is the main driving force in expanding Jewish areas. Conversely, despite the positive natural change overall reflected in the high proportion of 0-15 year olds in the other groups (particularly the Bangladeshi group) migration is the more important element in explaining changed group proportion in increasing areas for those groups. Migration is the driving force behind change in areas where group presence has reduced, except in some Jewish areas. Thus, as regards question 4 (migration or natural change) the situation is mixed with, particularly for areas where group proportion has increased, the more important element appearing to be at odds with what might be expected from the overall age profile of the group.

The Chinese group is quite different to the other three groups that have been examined. Whilst the very high presence of international students within that group creates a distinctive pattern to that group's distribution and the large rise in student numbers over the decade overwhelms the pattern of change, it does not explain all the differences.

Levels of congregation of (non-student) members of the Chinese group are very low. Peach notes that 'urban concentration allows the groups to pass the threshold size at which ethnic shops and religious institutions can be maintained and the proximity to members of the groups that allows the language and norms of the groups to be maintained' (Peach, 1996b, p386). This is reflected in the distribution found for three of our groups, but not the Chinese. So why might that be the case? There could well be a religion element to this. By definition, of course, there is a religious commonality within the Jewish and Sikh groups, though the degree of actual religiosity varies (Graham, Staetsky, and Boyd, 2014), and census outputs indicate that 90% of Bangladeshis described themselves as Muslim (and only 1% had 'No religion'). The Chinese group, on the other hand, includes 56% who indicated that they had 'No religion'; the next largest group (20%) were Christians; neither of these groups requires residential concentration. Additionally, at one of end of the

scale, the majority of Bangladeshi early immigrants originated in a relatively compact area of Bangladesh (Sylhet) and many later immigrants have family connections with the earlier arrivals (Ballard, 2004). In contrast, the origin of Chinese immigrants has evolved over recent decades. Initially, the arrivals were lowly qualified residents of rural Hong Kong; more recent immigrants came for a much wider section of south-east Asia. The most recent arrivals have been highly qualified (Luk, 2008, 2009). There is thus a much greater inherent heterogeneity in the Chinese group.

The influence of the different elements of the benefit of congregation clearly differ between the groups, and no one over-arching explanation for their current spatial distribution and its trajectory can be found. Indeed, the migration element of distribution embodies a tension between suburbanisation/counter-urbanisation 'fuelled' by socio-economic progress, and a desire for group congregation. The conclusion in relation to question 5 (heterogeneity), therefore, is that not only does heterogeneity between the groups confound any attempt to produce a 'model' of spatial distribution, but heterogeneity within each group means that producing any form of understanding of, or explanation for, the trajectory of distribution requires the examination of data at a detailed level, and is beyond the scope of global indices. In addition to presenting such information for previously studied ethnic groups, the paper has presented, for the first time, detailed analysis for two religion-based groups.

The key message of this research is that to achieve a full understanding of minority group spatial distribution, investigation at a fine geographic level is required and, more importantly, taking full account of the personal, household, and community characteristics of those involved, rather than placing too much reliance on measures that underplay the issue of heterogeneity within groups. Indeed, by taking proper account of group heterogeneity in analysing minority group spatial distribution, population analysts can better assist policy makers address issues of segregation, disadvantage, and cultural diversity.

7. Understanding recent internal migration of small cultural groups in England and Wales

In the previous chapter spatial distribution and its change over time for Jewish and other small cultural groups was addressed. One of the key drivers of changes in spatial distribution (alongside natural change and international migration) is internal migration. The focus of this chapter is on understanding the determinants of internal migration – what are the characteristics that determine why some individuals change their residential location within a country and other do not?

As regard the overall topic of this thesis, an important issue (as set out in the introduction to the thesis) is what the determinants of internal migration for Jews are. However another notable point of interest is whether there is a difference between the drivers for Jews and for other groups. As part of addressing both these key matters, this chapter examines the factors that influence to propensity to migrate for four similarly sized groups through the application of logistic regression.

This chapter reproduces a paper titled 'Understanding recent internal migration of small cultural groups in England and Wales' DOI 10.1080/1369183X.2016.1169918, which was submitted to the Journal of Ethnic and Migration Studies in December 2015, accepted in March 2016, published on line on 6 April 2016, and subsequently as pages 2589 to 2610 of Volume 42 Number 15, at the end of 2016.

Prior to undertaking the regression analysis some initial modelling that sought to examine the influence of a number of characteristics on the propensity to migrate was undertaken. That assessment, which did not control for the influence of other attributes but assisted in the selection of variables to be included in the regression analysis, is reported in Appendix B to this thesis.

Abstract

Taking advantage of the availability of 2011 England and Wales census microdata, and recognising the importance of internal migration in shaping the size and nature of communities, this paper seeks to identify and quantify the underlying determinants of internal migration of small cultural groups. The Jewish group is one of the longest present minority groups in Britain. Three other groups (Arab, Chinese,

and Sikh), which have been present in significant numbers for a much shorter period, are also examined. Multivariate binary logistic regression has been applied to data extracted from the 2011 safeguarded microdata files, to understand whether, having controlled for the variables identified, there remain residual unexplained differences between Jewish, other smaller group, and general migration levels. The study shows that the initial wide variation in migration propensity between these cultural groups is partly explained by compositional differences between groups, but that even after controlling for individual-level socio-demographic characteristics, regional location and distance of migration, cultural differences in migration behaviour remain. Overall, the study shows that there are fewer differences between Jewish and white British migration levels than for the other three groups, for whom a small but significant 'cultural group penalty', inhibiting migration propensity, remains.

7.1 Introduction

'It is a simple fact that in an average year more than 10 times as many people move home in the UK than migrate into it'; so state Champion and Fielding (2015, p xiii). Internal migration, defined as 'permanent residential relocation that involves a change of usual residence within a country' (Smith et al, 2015, p2), is thus an important element in shaping the population mix and size at a local level. The release of 2011 England and Wales census microdata has provided an opportunity to uncover and analyse the factors underpinning internal migration using broadly based up-to-date data on individuals. Unless otherwise stated, within this paper 'migration' and 'movers' refer to the act of, or the participants in, changing residential location within England and Wales and, in the analysis section, specifically in the twelve months prior to the 2011 England and Wales census.

The focus of this paper is on exploring the underlying determinants of internal migration of Anglo-Jewry and, to provide context, other similarly sized groups (0.5% of the population) – Arabs, Chinese, and Sikhs – and the white British dominant community. Groups of this size are sufficiently large to warrant and be capable of investigation but, to date, have largely fallen below the research radar which has focused on larger minority groups. This paper thus seeks to broaden the knowledge base regarding small group internal migration. As the groups have been identified through either ethnic grouping or religion, which are two important elements of cultural identity (see, for example, Jacobson, 1997), these sub-

populations are referred to in this paper as smaller cultural groups. The groups included represent the totality of within-range positively identified and coherent groups (that is, excluding residual 'other' and mixed categories) based on religion or ethnic group, except for Buddhists. Buddhists were originally included in the scope, but were found to fall into two distinct groups (both spatially and culturally) – Asian (hereditary) Buddhists and white (primarily recent convert) Buddhists. The size of each group fell well below the other groups under examination, and there was a clear overlap between the Asian Buddhist group and the Chinese group, hence the exclusion of a separate Buddhist group from the analysis.

The benefit in focusing on the Jewish group, the majority of whose members are fourth or fifth generation UK-born (Alderman, 1998), is that it may provide an insight into what might influence migratory behaviour in other, more recently arrived, groups in future generations.

The key questions that the paper seeks to address are as follows:

- Q1: Does the propensity to migrate vary between the white British majority/host group and the smaller cultural groups?
- Q2: Do the drivers of migration vary between the groups?
- Q3: Once quantifiable differences have been accounted for, is there a residual 'cultural group factor' that acts either positively or negatively on migration propensity?
- Q4: Do the answers to the above questions change when distance of migration is taken into account?
- Q5: Is there evidence of a distinction in behaviour between the Jewish and other groups which might reflect that group's longer established status?

The approach adopted in this study has been the development of multivariate logistic regression models. Prior to presenting the analysis, our understanding of the drivers of internal migration is briefly summarised, noting that no existing quantified analyses of the specific topic of Jewish migration within the UK have been identified. Availability of suitable data for this specific study is also addressed.

7.2 Background

Migration (both internal and international) has a long history of study (Boyle, Robinson, and Halfacree, 1998; Castles and Miller, 2009). Such is the range of

theories that have evolved, it is clear that (internal) migration is 'a highly important, yet frustratingly complex, phenomenon' ODPM (2002, p25), a viewpoint mirrored by Smith et al (2015). Certainly, there is a significant body of research focusing on drivers of internal migration on both sides of the Atlantic (see, for example, Greenwood, 1985; Molloy, Smith, and Wozniak, 2011, for the USA; Champion and Fielding, 1992; Champion et al, 1998; Fielding, 2012; and Smith et al, 2015 for the UK).

The clearest message that arises from this body of work is the strong relationship between age and the propensity to migrate, with rates peaking in young adulthood. Bailey and Livingston (2005, p ii) concluded that 'age is strongly associated with certain life-course transitions which are in turn associated with moving home'. In overall terms, migration is linked to: economics and the labour market – both at a personal/household level (employment opportunities) and the wider state of the national/regional economy (Fielding, 2012); the housing market and aspirations for improved housing tenure or quality (Smith and Finney, 2015); the distribution of places in education (Smith and Jöns, 2015); and it also varies by social and cultural attributes (Champion et al, 1998), and the overall level of internal migration is on the decline (Champion and Shuttleworth, 2015a; see Molloy, Smith, and Wozniak, 2011, for equivalent USA experience).

Much is already known about the underlying personal and household characteristics that have most influence on the propensity to migrate. For example,

> the presence of certain factors appears to act as a tie to an area, reducing migration rates. Such factors include: ownership of a home, rather than renting; having a job, but particularly being self-employed; having children in the household; and having caring responsibilities.
>
> (Bailey and Livingston, 2005, p ii)

The resulting geographic patterns of migration in Britain have been found to demonstrate two strong, but possibly conflicting, patterns. Firstly, there is a London and south-east England effect; the strong economic performance of the region acts as an attractor, particularly for young adults, whereby the region acts as a 'social escalator', allowing people to make socio-economic progress (Fielding, 1992, 2007). More recent work has identified a subsequent 'regional return' effect (Champion, 2012). The second major trend is counter-urbanisation and the 'counter-urbanisation cascade' (Champion and Atkins, 1996) – net migration flows from Inner London to

Outer London; from principal metropolitan cities to other cities; and from these areas progressively to smaller urban areas through various gradings to the most remote rural areas. More recent research has found a continuation of the process, though possibly with reducing intensity (Champion, 2005a; Simpson and Finney, 2009; Lomax et al, 2014).

Of most relevance to the current study is work that has been carried out in connection with minority group migration in the UK. Here, attention is given to the understanding of underlying determinants, rather than locational aspects (for example, Stillwell and Hussain, 2008; Simpson and Finney, 2009), or more qualitative issues (see Phillips and Robinson, 2015, for an overview).

Given that migration information grouped by religion has been available from the 2001 census (albeit in the form of specially commissioned tables), it is a little surprising that almost all published research focuses on ethnic groups. Gale's (2013) study of Birmingham includes an extensive examination of internal migration of groups by religion in and to/from the city. Whilst the focus is on the Muslim group, for which he found a 'net outward movement … from areas of high community concentration' (p888), all the census-named religions are presented in the analysis. That work appears to be the only accessible publication making use of these data.

Finney and Simpson (2008) examined the impact of some socio-economic characteristics of ethnic groups concurrently. Prior to taking these characteristics into account, the migration propensity for most non-white groups appears higher than for white Britons. However, once these variables are accounted for, the majority of groups are found to have a lower than or similar likelihood of moving as the host community. Examining the economic aspects in more detail, Catney and Simpson found a social gradient 'favouring professional and managerial classes for residential mobility in general, and for longer distance movement across district boundaries and away from districts of past immigration' (2010, p582). The conclusion did not apply to the Chinese group, and there were a number of variations in respect of London. At an international level, Bernard, Bell, and Charles-Edwards (2014) found that different cultural backgrounds led to a variation in the age at which life-course changes occurred (and thus the age/migration profile); this might be relevant in examining migration differences between cultural groups within a single country.

In addition to a closer examination of these differences, there are a number of gaps in the knowledge base that the current study seeks to fill. Firstly, there might be intrinsic behavioural differences for religion-based group such as Jews, who have not previously been investigated in this way; or Sikhs, often considered only as a sub-set of the Indian ethnic group; or for under-studied ethnic groups such as Arabs. Secondly, following a more than doubling in its student numbers since the 2001 census, the Chinese group's migration behaviour warrants further examination. Indeed, more generally, this study provides an opportunity to re-visit the relationship between population characteristics and propensity to migrate based on 2011 census microdata, rather than 2001 data utilised in many of the published works, particularly in the light of the apparent downward trend over time in overall migration rates.

Finally, we should not lose sight of the view expressed by Everett Lee fifty years ago that 'the decision to migrate is never completely rational, and for some persons the rational component is much less than the irrational' (Lee, 1966, p51).

7.3 Sources of data for this study

The majority of projects researching internal migration in the UK have used either census data or data from the National Health Service Central Register (NHSCR)/Patient survey. However, for this study, data sources are more limited, as the NHSCR does not record religion or ethnic group, and this limitation applies to most of the other specialist sources. Some sources, such as the British Household Panel Survey, its successor Understanding Society, and the Office for National Statistics (ONS) Longitudinal Study do include such information, but the sample size (for Jews and similarly sized minority groups) is too small for investigating the determinants of migration.

Two 5% sample individual microdata files (the Local Authority and Regional files) from the 2011 census have been made available by ONS to approved researchers; they include records for over 26,000 Jews, of whom more than 3,000 moved home between 2010 and 2011 (and similar numbers for the other small groups). Both files provide access to a wide range of characteristics, allow migration to be examined in considerable detail, and are the primary source used in this study. The population for this study includes all usual residents of England and Wales, aged over 1 year of age (that is, excluding those who did not have a 12 months prior-to-the-census address in England and Wales), including students recorded at their term

time address, captured in either file – 5.46 million persons. Of these, about 0.61 million (11%) are 'movers' – their address 12 months prior to the census was somewhere else within England and Wales.

Table 7.1 provides a basic summary of information about the relevant groups contained within the overall dataset. It should be noted that Arabs can only be identified in the regional file (they are grouped with 'other ethnic groups' in the local authority file); thus there is only a 5% sample available for Arabs, compared with 10% for the other groups.

Table 7.1 Source data sample size

	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents
England and Wales (E&W) Usual Residents 2011	10,419	34,518	25,552	40,824	4,444,115	5,469,962
Of whom, within E&W migrants 2010-2011	1947	7902	2915	3497	455,408	610,072
Migrant proportion	19%	23%	11%	9%	10%	11%
Of whom, proportion moving 20km or further	23%	30%	24%	26%	26%	25%

Source: Calculated from 2011 Census Safeguarded Microdata

The table summarises the proportions moving home in the 12 months prior to the census, and indicates that more than twice the proportion of Chinese residents of England and Wales moved than did the white British group. Figure 7.1 presents migration-by-age information, and Figure 7.2 illustrates the age profile for each group as a whole (not just migrants). Both figures show a peak for the Chinese group in the 19-24 year age range – suggesting that the high overall migration rate for the Chinese group arises from a combination of a high likelihood of those in that age group migrating, with a large proportion of the Chinese population falling into that age group. The Chinese group also has the highest proportion making longer distance moves.

Whilst the microdata provide information on a wide range of characteristics it is important to recognise some short-comings in relation to investigating migration (Champion et al, 1998; Bailey and Livingston, 2005). Most particularly, socio-economic characteristics applying prior to the move (and potentially 'explaining' the

decision to move) cannot be ascertained[12] – so, for example, if an unemployed person moved home to take up employment this cannot be ascertained as only the employment status on census day is recorded. So, to what extent does this possible weakness impact on use of this data source?

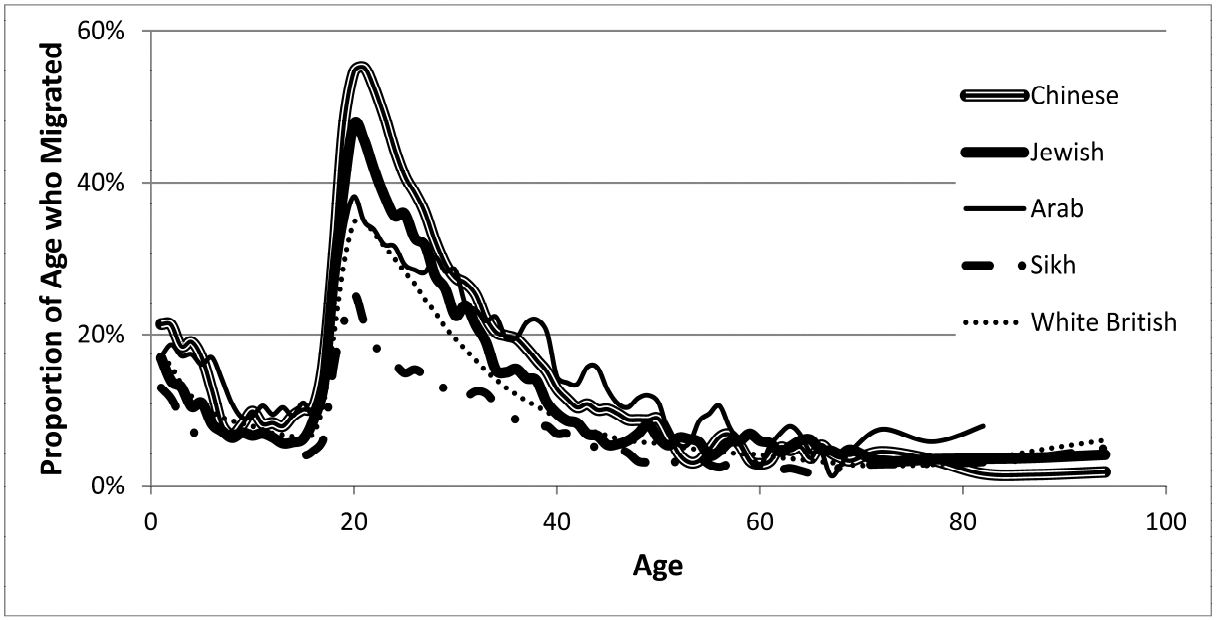

Figure 7.1 Proportion of each age who migrate

This study is not, of course, the first to use UK census data to examine drivers of migration (see, for example, Bailey and Livingston, 2005; Finney and Simpson, 2008; and Manley and Catney, 2012; none of whom comment on the potential impact of this potential drawback on the analysis and results presented). It is, therefore, worth considering whether there might be other sources of data that could shed some light on the issue.

Three major high-quality sources were examined. The ONS Longitudinal Study was ruled out as its prior-to-move characteristics relate to the previous census, at least nine years prior to the move. Understanding Society had to be ruled out due to severe attrition of respondents becoming untraceable because they have moved home (Knies, 2014). The longitudinal version of the Labour Force Survey (LFS)

[12] Though for some types of move, the post-event characteristics are more pertinent – for example, although the intention to become a student might be known well in advance of a person moving from the parental home to study elsewhere, the change in personal characteristic relating to the move – becoming a student – only occurs as or after the move takes place, and is only recorded then.

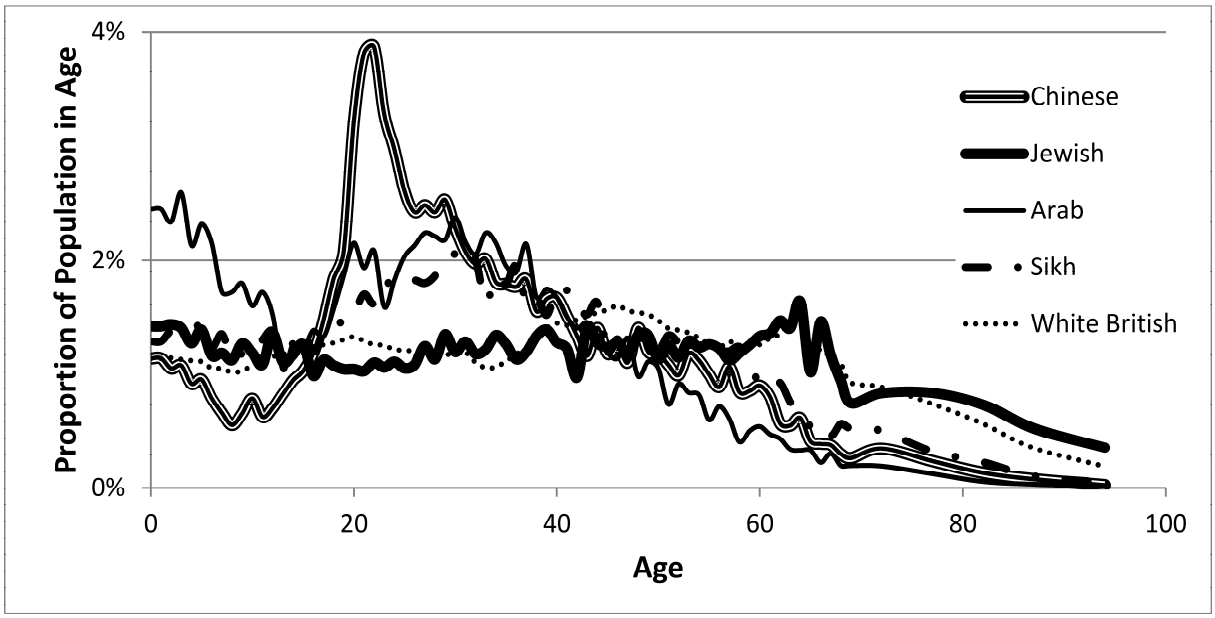

Figure 7.2 Proportion of population falling into each year of age

was also ruled out as movers are automatically replaced by new occupants, making that output irrelevant to this study (ONS, 2015b).

The main (non-longitudinal) output from the LFS does include a variable that indicates whether the respondent was living at the same address 12 months previously, so it is possible to identify migrants (ONS, 2011b). The April to June 2011 quarterly survey (ie a period close to the 2011 census) includes 9,700 individuals who had been at their current address for less than 12 months; 9.7% of the total of 100,200 persons (all of whom live in private households and are aged 16 or more) who responded to the question – a proportion not materially different to the census figure. Specific questions compare employment status 12 months prior to the survey with current employment status; thus it is possible to produce a broad comparison of economic activity status at the time of the survey, and 12 months prior, split between those present at their current address for less than 12 months (movers) and those resident for longer (non-movers), for the 66,200 (of the 100,200 individuals mentioned above) who have these data recorded, using a data file accessed via the UK Data Service.

Table 7.2 summarises the split between movers and non-movers based on looking back 12 months from the survey date and, which might be thought to be preferable, looking forward from 12 months prior to the survey date. This table shows very little difference in the propensity to migrate based on economic status after the event, and before the event; indeed, none of the differences is significant at

the 5% level. The analysis of the LFS shows that the overall propensity to move is unaffected by measuring economic status[13] prior to or after the event, and thus supports the use of (post-event) census data in the examination of migration.

Table 7.2 Proportion of movers based on timing of status measurement

	Based on survey day economic status		Based on 12 months prior economic status	
Economic activity	Sample size	Mover proportion	Sample size	Mover proportion
Employed	38,020	9%	37,455	9%
Unemployed	3010	16%	2169	14%
Full time student	2759	17%	4278	16%
Looking after family or home	3286	13%	4073	11%
Sick	3863	7%	3836	7%
Retired	14,049	2%	13,509	2%
None of these	1227	11%	894	22%
All categories	66,214	8%	66,214	8%

Source: Calculated from Apr-Jun 2011 Labour Force Survey

7.4 Study approach and methodology

Previous researchers, for example Bailey and Livingston (2005), Champion (2001), and Simpson and Finney (2009), have investigated census data in order to identify the primary characteristics that are the determinants of migration, and there is no intention to 'reinvent the wheel' here. However, identification of key characteristics is undertaken with the intention of determining whether it is differences in the distribution of these characteristics between the minority groups that explains overall difference in migration rates for these groups, or whether some unexplained residual 'cultural group factor' remains in play.

The variables initially under examination are those listed in column 1 of Table 7.3 (plus 'Age of Individual' and 'Formal Marital Status' mentioned in the table footnote). In addition, a cultural group variable was defined, with 'white British' as the reference category, and Arab, Chinese, Jewish, Sikh, and other

[13] Neither the LFS nor any other data source examined permitted a 12-months prior comparison to be made for any other characteristics found to be relevant in this study.

background as the other categories. The 'other background' category was not used for analysis proposes – it simply represents the residents of England and Wales who did not fall into the white British or smaller cultural group categories, and permitted the same dataset to be used for analysis of 'All Usual Residents' and (suitably filtered) for analysis of individual groups of interest.

Previous studies have focused on persons aged 16 and older, or excluded persons not living in households (for example, Bailey and Livingston, 2005). Exclusion of parts of the population appears to be based on simplicity of data preparation – standard economic activity categories tend to omit those aged under 16, and housing tenure categories usually omit communal institution residents. However, the range of these variables can be extended to cover all residents by increasing the number of categories. In addition, the current study uses an 'age of household reference person (HRP)' variable[14] in parallel with an 'age of individual' variable to overcome any issue of whose decision determines the migration of young

Table 7.3 Order of inclusion of variables

Model / Variable	All Usual Residents	Arab	Chinese	Jewish	Sikh	White British
Age of HRP	1	1	1	1	2	2
Tenure	2	2	2	2	1	1
Family mix	3	3	4	3	5	5
Living arrangement	4	x	6*	6	6	3
Qualifications	5	x	5	5	3	4
Economic activity	6*	5*	7*	4	7	6*
Year of arrival	x	4	3	x	4	x
Health	x	x	x	x	x	x
Care provider	x	x	x	x	x	x
Gender	x	x	x	x	x	x

Note: 'Age of Individual' and 'Formal Marital Status' removed due to collinearity issues
* inclusion of variable improved -2LL by less than 0.25% cf null model
x inclusion of variable would improve -2LL by less than 0.1%

[14] Represented by the age of the individual for those living in communal establishments.

children. The current analysis is thus more comprehensive than previous studies as it includes all usual residents of England and Wales irrespective of age[15] or abode.

Initial modelling examined the extent to which each variable, acting alone, 'explains' the propensity to migrate. This found that three of the variables – tenure, age, and age of HRP – are major determinants of migration; living arrangement, marital status, family mix, and economic activity are moderate contributors; highest qualification and year of arrival have a minor impact; and health, care provision and in particular gender, have only a very small impact. It is, however, very important to avoid a material level of collinearity between variables if a statistically robust regression model is to be produced. Analysis of collinearity led to the exclusion of individual age and marital status from the variables being used; age of HRP and living arrangement having been found to produce superior model performance. The regression analysis was carried out using IBM SPSS software (v21 and v22). The variables to include were mainly determined through manually selected combinations and sequences, though automated stepwise analyses were also undertaken. The final selection of variables was based on a combination of quantitative assessment (Akaike information criterion (AIC), minus 2 log likelihood (-2LL) improvement, and R values) and a qualitative consideration of the balance of model complexity and extent of model fit improvement. This approach led to the inclusion of age of HRP, tenure, family mix, living arrangement, highest qualification, economic activity, and, because of its significance for some of the cultural groups, year of arrival, in the final model (see Table 7.3).

7.5 Regression analysis for all usual residents

Logistic regression has been carried out to explore the relationship between the seven identified variables and the propensity to migrate in the 12 months preceding the 2011 census for all usual residents of England and Wales. The analysis has been carried out in three stages. In the first stage the two variables (age

[15] The analysis has additionally been carried out with persons under the age of 16 excluded, to determine whether there is a material penalty involved in including the full age range in the model. All trends and conclusions described in this document would also apply to an adult only model. As omitting 20% of the population from the analysis would provide only a marginal improvement in model fit (Nagelkerke R^2 increases from 0.27 only to 0.29), the full age range has been retained in the modelling.

of HRP and tenure) found to have materially more explanatory power than the other variables are introduced to the model. A second stage introduces four 'middle order' variables, and the final stage adds in year of arrival, due to its minimal role for some groups. Only the results for the complete model are described here, though it is worth noting that the first stage model (two variables) produces 19% of the 21% improvement in goodness of fit (-2LL) compared with the null (constant only) model. The results of the analysis are presented in Table 7.4. All the coefficients and odds are significant at the 1% level (hence the absence of any differentiating annotation within the table).

Each of the variables used is, overall, statistically independent of the others (significance levels all below 1%), and the odds of being a migrant for the reference case (a full time employee living in a married couple family, which has two or more dependent children, of whom the youngest is aged 0-9, living in a house with mortgage, in which HRP is aged 40-49) is 0.050 – that is, for every 50 reference persons who moved in the 12 months prior to the census there were 1000 who did not.

The odds of moving are three to four times higher than the reference age of HRP (40-49) for those living with an HRP aged under 24, and only about two-thirds for the oldest HRP groups, and there is no overlap between the 95% confidence intervals of the odds ratios for any of the age groups. As regards the impact of dependent children, the lowest odds are for persons who live in households where the youngest (or sole) dependent child is aged 10-18 (that is, secondary school children); families without dependent children have higher odds of moving. Other results reflect those found in many previous studies - for example, the odds of moving are four times as much for those who rent from a private landlord than for home owners; those living as cohabiting couples have almost twice the odds of moving as married couples; degree holders are the group most likely to migrate, and those with no qualifications least likely; and the odds of being a migrant for unemployed persons are greater than those in work. The final section demonstrates that non-UK born individuals who arrived prior to 2001 are less likely to migrate than UK-born persons, whereas more recent arrivals are more likely to have moved within England and Wales in the 12 months prior to the census, having controlled for the other variables.

Table 7.4 Migration propensity logistic regression analysis for all usual residents

Variable / category	For each model, the first column is the regression coefficient; the second column are the odds relative to the reference category					
	Stage 1 model		Stage 2 model		Stage 3 model	
Age of HRP (reference: 40-49)						
18 or below	1.62	5.06	1.28	3.58	1.28	3.59
19 to 24	1.89	6.61	1.43	4.16	1.42	4.16
25 to 29	1.07	2.90	0.75	2.11	0.74	2.09
30 to 39	0.50	1.64	0.38	1.47	0.37	1.45
50 to 59	-0.17	0.85	-0.27	0.77	-0.26	0.77
60 to 74	-0.49	0.61	-0.42	0.65	-0.41	0.66
75 and over	-0.80	0.45	-0.55	0.58	-0.54	0.58
Tenure (reference: owned with mortgage)						
owned outright	-0.04	0.96	-0.02	0.99	-0.02	0.98
council tenant	0.31	1.37	0.42	1.53	0.42	1.53
RSL, shared ownership, or free	0.55	1.73	0.59	1.81	0.59	1.80
private landlord	1.61	5.01	1.49	4.45	1.47	4.35
other household tenures	1.21	3.36	1.13	3.08	1.11	3.05
hall of residence	1.99	7.32	1.23	3.42	1.23	3.42
other communal establishment	2.01	7.45	1.45	4.25	1.45	4.28
Family mix (reference: 2+ dependent children, youngest aged 0-9)						
no dependent children			0.33	1.38	0.32	1.37
1 dependent child age 0-9			0.29	1.33	0.28	1.33
1 dependent child age 10-18			-0.08	0.93	-0.08	0.93
2+ dep children youngest 10-18			-0.28	0.76	-0.28	0.76
not living in a family			0.60	1.82	0.59	1.80
not living in a household			1.19	3.28	1.17	3.23
Living arrangement (reference: in couple: married)						
in couple: cohabiting			0.68	1.97	0.68	1.98
not in couple: single			0.26	1.30	0.27	1.30
not in couple: married			0.42	1.52	0.41	1.50
not in couple: separated			0.75	2.12	0.77	2.16
not in couple: divorced			0.14	1.15	0.16	1.17
not in couple; widowed			-0.16	0.85	-0.15	0.86
Highest qualification (reference: level 4 degree)						
pre-school age			-0.14	0.87	-0.14	0.87
primary school age			-0.21	0.81	-0.22	0.81
secondary school age			-0.13	0.88	-0.14	0.87
no qualifications			-0.47	0.63	-0.47	0.63
level 1, 2 , apprentice, other			-0.32	0.73	-0.32	0.72
level 3 A levels			-0.04	0.96	-0.03	0.97
Economic activity (reference: full time employee)						
part time employee			-0.17	0.84	-0.17	0.85
self employed			-0.10	0.91	-0.09	0.91
unemployed			0.16	1.18	0.17	1.18
retired			-0.37	0.69	-0.36	0.70
student post 16			0.25	1.29	0.23	1.26
looking after home / other inactive			0.07	1.07	0.07	1.07
permanently sick			-0.24	0.79	-0.23	0.80
child at school			-0.20	0.82	-0.20	0.82
Year of Arrival (reference: UK born)						
arrived before 1991					-0.24	0.78
arrived 1991-2000					-0.08	0.92
arrived 2001-2006					0.04	1.04
arrived 2007-2011					0.19	1.21
Constant / Reference Case Odds	-2.89	0.055	-3.00	0.050	-2.99	0.050
Null Model -2LL	3,825,746		3,825,746		3,825,746	
Stage Model -2LL	3,113,209		3,040,873		3,039,211	
Stage Improvement	712,537		72,336		1,662	
Stage improvement (cf Null -2LL)	19%		2%		0%	
Cox & Snell R^2	0.12		0.13		0.13	
Nagelkerke R^2	0.24		0.27		0.27	

Note: **ALL** relative odds are significant at the 0.01 level

Population (N) 5,469,962

As regards the overall 'quality' of the model, each of the included variables has an impact that is statistically significant (at the 1% level) and each category in each variable has odds significantly different to the reference category. We can thus conclude that the model meets the aim of determining which variables are statistically significant predictors, and how changes in those variables relate to changes in migration propensity. However, as is often the case with logistic regression models in the field of human behaviour, the coefficient of determination R^2, is relatively low (Nagelkerke R^2 = 0.27) indicating that, although the model is good from an *explanatory* perspective, caution should be applied in attempting to use this type of model for *predicting* the level of migration.

7.6 Cultural group differences

Differences between the overall migration propensities of the smaller cultural groups have already been summarised in Table 7.1. These differences can be presented in terms of odds relative to the white British group by re-running the logistic regression with *only* the cultural group variable, giving relative odds of Arab 2.02, Chinese 2.60, Jewish 1.13, and Sikh 0.82; all these odds are significantly different to the white British at the 1% level. Based on the raw data, therefore, there is (except for the Sikh group) an apparently wide range of *higher* migration propensity, with odds for Chinese and Arab groups more than twice that for the white British group (see Finney and Simpson, 2008, for a similar conclusion for the Chinese group, the only group common to the two studies, based on 2001 data).

However, if the seven-variable model is re-run with the addition of a cultural group variable, the relative odds (having controlled for the seven variables) become: Arab 0.87, Chinese 0.91, Jewish 1.00, and Sikh 0.91 (in each case the 95% confidence interval is approximately +/- 0.04 around the given odds). These seven variables have thus accounted for the whole of the apparent difference between white British and Jewish migration propensity, and have left the other groups with small (but statistically significant) *lower* odds of migration than the host group.

This result directly addresses study question Q1 (are there differences in propensity to migrate between various groups); but can additional analysis provide a clearer understanding of those differences (Q2)? As the majority of the apparent differences between the smaller groups and the dominant white British group can be

resolved through controlling for certain individual or household characteristics, it follows that these differences must consist of differences in:

- the balance of the population falling into different categories, and/or
- behaviour for given combinations of characteristics.

An indication of the first element can be ascertained by examining the content of the dataset and the Stage 3 model relative odds in the final column of Table 7.4. Table 7.5 provides a summary of which groups are over-represented in categories that exhibit low odds or under-represented in categories that have high migration odds, and also the reverse situation. The modelling has established that age of HRP and tenure are the two most influential of the explanatory variables (both for all usual residents and each of the cultural groups separately), and these characteristics feature extensively for the Chinese and Arab groups in Table 7.5 (and see also Figure 7.2). Indeed, the Chinese and Arab groups each have eight entries in the top part of the table (and just one in the lower part), indicating that the mix of characteristics provides a major element in explaining their high odds of migration in the raw data.

Table 7.5 Bias in composition of population

	Arab	Chinese	Jewish	Sikh
under-representation in low-odds categories	HRP aged 60 or more owned tenure no qualifications retired	HRP aged 60 or more retired		HRP aged 75 or more retired
over-representation in high-odds categories	HRP aged 25 to 39 private renting student arrived 2001-11	HRP aged 19 to 29 private renting not in a family or household degree qualified student arrived 2001-11	degree qualified	
over-representation in low-odds categories		arrived before 1991	married couple	married couple arrived before 1991
under-representation in high odds categories	no dependent children			cohabiting couple

To investigate the second element, the logistic regression analysis undertaken for all usual residents has been repeated separately for white British, Arab, Chinese, Jewish, and Sikh groups. Although the same three stage analysis was carried out, for reasons of space only the results for the models with all seven variables are summarised in Table 7.6. The purpose of the table is to draw attention to any differences in behaviour between the various groups. The relative odds of migration of the various categories within each variable are shown in the first column for the white British host/dominant group. The odds produced by the other models are included in the other columns of the table. In addition, where the 95% confidence interval for the relative odds for any of the other groups lies wholly above or below the interval for the white British group, an 'H' (higher) or 'L' (lower) annotation has been added, highlighting differences in behaviour from equivalent members of other cultural groups. This is a cautious approach to the interpretation of confidence intervals (see Cumming and Finch, 2005).

A number of differences in behaviour for the small cultural groups can be ascertained from Table 7.6, having controlled for the other variables. These include:

- A greater suppression of migratory activity in Jewish households with an HRP aged 50 or more, than seen in the white British group; and a lower increase in migration in Arab households with an HRP aged 19 to 39 than seen in equivalent white British households.
- The material increase in migration propensity of individuals living in rented accommodation (including halls of residence) compared with home owners seen in the white British group is much more muted in the Chinese group and, for the privately rented sector, for Jews and Sikhs. Indeed, migration propensity for Jews in halls of residence is far below that of home owners, whereas for the white British group it is much higher.
- Whilst the impact of different family types is broadly similar for white British, Arab, and Sikh groups, there is noticeably less variation for Chinese families.
- Similarly, there is much less variation between different living arrangements in the minority groups than for white Britons; indeed for the majority of categories and groups the odds are not significantly different to the reference

Table 7.6 Migration propensity logistic regression analysis for cultural groups

	White British	Arab		Chinese		Jewish		Sikh	
	Relative odds	Relative odds	95% CI	Relative odds	95% CI	Relative odds	95% CI	Relative odds	95% CI
Age of HRP (reference: 40-49)									
18 or below	3.87	2.75		1.05	L	3.51		8.02	H
19 to 24	4.27	2.33	L	3.89		5.10		4.34	
25 to 29	2.18	1.54	L	2.38		2.46		2.44	
30 to 39	1.48	1.14	L	1.48		1.52		1.59	
50 to 59	0.78	0.80		0.73		0.66		0.86	
60 to 74	0.66	0.55		0.67		0.54		0.80	
75 and over	0.57	0.80		0.65		0.36	L	0.58	
Tenure (reference: owned with mortgage)									
owned outright	1.02	0.96		0.76	L	0.92		0.67	L
council tenant	1.50	1.32		1.25	L	1.17		1.65	
RSL / shared ownership / free	1.83	1.53		1.34	L	1.95		1.80	
private landlord	4.88	2.59	L	1.90	L	3.29	L	3.64	L
other household tenures	3.25	2.21		1.33	L	2.31	L	2.07	L
hall of residence	3.63	not		1.22	L	0.42	L	2.55	
other communal establishment	4.12	calculated		2.15		1.03		2.51	
Family mix (reference: 2+ dependent children, youngest aged 0-9)									
no dependent children	1.45	1.34		1.08	L	1.68		1.50	
1 dependent child age 0-9	1.33	1.40		1.10	L	1.52		1.34	
1 dependent child age 10-18	0.93	0.85		0.82		1.22		0.99	
2+ dep children youngest 10-18	0.75	0.78		0.65		1.04	H	0.77	
not living in a family	1.84	2.17		1.57		1.96		2.01	
not living in a household	4.13	not calculated		1.49	L	13.28		3.39	
Living arrangement (reference: in couple: married)									
in couple: cohabiting	2.16	1.31	L	1.50	L	1.84		1.18	L
not in couple: single	1.45	0.89	L	1.07	L	1.33		0.69	L
not in couple: married	2.23	0.82	L	0.96	L	1.11	L	0.84	L
not in couple: separated	2.58	1.09	L	1.25	L	2.10		1.68	L
not in couple: divorced	1.26	0.81	L	0.87	L	1.18		1.03	
not in couple; widowed	0.92	1.01		0.55	L	1.07		0.69	
Highest qualification (reference: Level 4 degree)									
pre-school age	0.86	0.95		1.22	H	0.66		1.14	H
primary school age	0.83	0.83		0.96		0.60		0.97	
secondary school age	0.90	0.76		1.02		0.58		1.02	
no qualifications	0.59	0.96	H	0.88	H	0.64		0.62	
level 1, 2 , apprentice, other	0.70	0.93	H	0.85	H	0.69		0.67	
level 3 A levels	0.91	1.12		1.27	H	1.11	H	0.97	
Economic activity (reference: full time employee)									
part time employee	0.85	0.83		0.84		0.70	L	0.83	
self employed	0.92	1.00		0.84		0.84		0.88	
unemployed	1.22	0.86	L	1.16		0.93		0.82	L
retired	0.73	0.46		0.61		0.84		0.74	
student post 16	1.44	0.91	L	0.96	L	1.03	L	1.10	L
looking after home / other inactive	1.09	0.74	L	0.95		0.77	L	0.88	L
permanently sick	0.81	0.86		0.46	L	0.37	L	0.69	
child at school	0.79	0.92		0.67		0.80		0.79	
Year of arrival (reference: UK born)									
arrived before 1991	1.02	0.59	L	0.67	L	0.69	L	0.45	L
arrived 1991-2000	1.09	0.84	L	1.03		0.93		0.89	
arrived 2001-2006	1.02	1.10		1.37	H	0.99		1.12	
arrived 2007-2011	1.31	1.58		1.62	H	0.86	L	1.18	
Constant / Reference Case Odds	0.04	0.10		0.12		0.07		0.08	
Population (N)	4,423,727	10,217		34,403		25,552		40,824	
Null Model -2LL	2,923,384	9,702		37,021		18,140		23,872	
Final Model -2LL	2,282,711	8,484		29,162		14,298		19,249	
Improvement (cf Null -2LL)	22%	13%		21%		21%		19%	
Cox & Snell R^2	0.14	0.11		0.20		0.14		0.11	
Nagelkerke R^2	0.28	0.18		0.31		0.28		0.24	

married couple group, whereas for the white British group some categories display twice the odds of the married couple category.

- White British adults without degree qualifications demonstrate noticeably lower migration rates than degree holders; however, such reductions are generally absent for non-degree holding Arabs and Chinese.
- Although the spike in student migration levels is reduced to only a 40% increase for the white British group when other variables are controlled, no significant increase at all is shown for students in any of the small groups.
- For those groups with a material proportion not born in the UK (Arabs, Chinese, and Sikh) there is a consistent pattern of the earliest arrivals demonstrating a lower propensity to migrate than those born in the UK, and the latest arrivals a higher likelihood of moving; the variation is much less for the white British and Jewish groups whose members are largely UK born.

Responding to Q3, therefore, there are subtle variations in migration propensity between many of the cultural groups across a number of the variables, after controlling for the other attributes.

7.7 Contextual/locational issues

Might the remaining small Q3 residual differences, which have not been explained by individual/household information gleaned from the census, relate to contextual issues or some specific (unquantifiable?) factor associated with the cultural group?

Given the nature of the data used in the analysis, the lowest level of residential geography that can be applied to the whole dataset is regional[16]. Re-running the logistic regression with the addition of a simple categorical region variable, although 'improving' the overall model in terms of -2LL goodness of fit by less than 0.1% does, however, bring the relative odds of migration for all the small

[16] That is, the nine formal NUTS level 1/former government office regions in England, plus Wales. Additionally, as the small cultural groups have a strong London focus to their spatial distribution, and there are recognised socio-economic differences between inner and outer London, the London Region has been split into inner and outer parts (as defined by ONS) to spatially disaggregate their area of highest concentration.

cultural groups to within 5% or 6% of the white British value (Arab 0.94, Chinese 0.95, Jewish 1.06, Sikh 0.95) – that is, after allowing for the different regional distributions of the minority groups. These values are significantly different to the white British at the 5% level (the 95% confidence intervals just fail to include 1.00 by a margin of 0.004 to 0.02); the regional variable effectively explains about half of the residual differences between the groups. This simple variable, which indicates that the odds of moving are highest for south west and south east England, and lowest for outer London, does not provide any *explanation* for the regional differences. However, examination of other data sources has allowed regional values of four parameters, relevant to migration decisions, to been calculated: unemployment levels; disposable income; house prices; and a deprivation indicator[17] (Fielding, 2012; Boyle et al, 1998; Bailey and Livingston, 2008; Helliwell, 1996). Further application of the logistic regression model indicates that, when applied together, these parameters capture over 90% of the variation revealed by the 'catch all' categorical regional variable. When applied individually, unemployment levels and general deprivation each account for 50% to 60% of the impact (increases in their values leading to a reduction in migration), whilst house price and household income account for a minimal 5% and 1%, respectively.

7.8 Distance of moves

One final piece of analysis was carried to understand how these differences in behaviour patterns might be reflected in, or explain, differences in migration distances between the groups (Q4) – longer distance moves being more likely to be associated with changes in employment, whereas shorter distance moves have a

[17] Unemployment figures are the rate for those aged 16-64 for the September to November quarter of 2010 sourced from the Labour Force Survey Regional Labour Market: HI00 - Headline LFS Indicators for All Regions, May 2013 (http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-265428). Income figures used are gross disposable household income per head for 2010, sourced from ONS Regional Household Income, Spring 2013 Table 1.1 (http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-298694). The house price index was obtained by averaging the monthly index values from April 2010 to March 2011 from the Land Registry website (https://www.gov.uk/government/organisations/land-registry). Due to incompatibilities between the official English and Welsh indices of multiple deprivation, regional averages were calculated from the 'deprivation indicators of a household' variable already included in the census microdata files; it includes education, health, employment, and housing deprivation markers.

stronger housing market element (Nivalainen, 2004). The microdata were examined, using 20km as a cut-off between shorter and longer distance moves, based on only one person in eight commuting further than that distance (Champion, Coombes, and Brown, 2009) and to ensure that the longer-distance sample size for the cultural groups remained robust. The raw data indicated that 30% of Chinese moves fell into the longer distance bracket, significantly more (at the 5% level) than the 23% to 26% proportion applicable to the white British and other small groups (see Table 7.1). The logistic regression for all residents was re-run with the records split into shorter and longer distance datasets, and this identified certain characteristics with markedly different odds of migration between the two models. Characteristics that led to much higher odds of migrating a longer distance were: persons not living in a household in general, and in halls of residence in particular, and being qualified at degree level. Much lower odds of making a longer distance move applied to: public sector home renters; living in households with a dependent child or children; having no academic qualifications; living in Outer London; or having arrived in the UK since 2007. As with migration levels as a whole, once individual characteristics and regional context are controlled for, differences in behaviour found in the raw data are largely accounted for (see Table 7.7). Indeed, the odds of making a longer distance move for the Chinese group are the lowest of all the groups at only 0.81 of the odds for the white British group (the other groups report values of 0.85 to 0.92). Thus, despite the high proportion of longer distance moves found for the Chinese group, based on the group's characteristics an even higher proportion would be expected. Conversely, for moves of less than 20km the migration propensity for the Chinese and Sikh groups is not significantly different to the white British group, whereas the Jewish group has higher odds (1.12) and the Arab group lower odds (0.93) of making such moves.

The important message from this section of the analysis is that, certainly for the Chinese and Sikh groups, the cultural group penalty manifests itself in dampening the level of longer distance moves, with shorter distance moves unaffected, though for the Arab group the effect has both longer and shorter distance elements. One explanation, particularly for the Chinese, is the group's proportion who are international students. The microdata show that 12% of the Chinese group are students who have arrived in the UK in the 2007-2011 period (indeed over 40%

of 2007-2011 Chinese arrivers are students). The population for this study is individuals with a residential address in England and Wales both on the date of the 2011 census and also 12 months prior to that date. Thus the sample excludes the (international) pre-university to university move of overseas-based students, but includes the equivalent (mainly over 20km) move for UK-based students. This is borne out by an examination of the distance of move of occupants of halls of residence; the proportion making a long-distance move is 88% for white Britons and Jews, whereas it is only 56% for Chinese and Arabs. This difference is sufficient to explain a major proportion of the difference in odds for longer distance moves between the Chinese and the white British groups.

Table 7.7 Summary of odds of migration relative to the white British group

	Arab	Chinese	Jewish	Sikh
Raw data	2.02	2.60	1.13	0.82
After controlling for seven characteristics	0.87	0.91	1.00[n]	0.91
And (additionally) a regional variable	0.94	0.95	1.06	0.95
In respect of moves of less than 20km	0.93	1.02[n]	1.12	0.97[n]
In respect of moves of 20km or more	0.92	0.81	0.86	0.85

Except for those marked [n] all odds are significantly different to the white British group at the 5% level

7.9 Conclusions

This paper has offered two methodological innovations. Analysis has been undertaken using the whole age range of the population, and including individuals not resident in households. In part this has been possible through the use of an age of HRP variable (represented by age of individual for communal establishment residents), rather than the age of the individual as used in most studies. Results from this analysis are in line with those taking a more conventional approach, but more statistically robust due to the retention of the full sample. In addition, through an analysis of Labour Force Survey data, this study has legitimated the normally implicit assumption that, when studying migration, (post event) census characteristics provide a good proxy for pre-move characteristics.

In more substantive terms, this paper set out to answer five previously unanswered questions regarding the migration behaviour of Jews and other smaller cultural groups. The study has confirmed that there are differences in the propensity

to migrate between the host group and the smaller cultural groups (Q1). As has been found in studies of other groups (for example, Finney and Simpson, 2008), a major proportion of the apparent difference in migration propensity between groups can be explained by materially different age profiles of the groups, although there are a number of combinations of individual characteristics where migration propensity varies noticeably between the groups (Q2). However, notwithstanding the explanation for a large element of the variation between groups through compositional and contextual/locational factors (regional levels of deprivation and unemployment), there are differing migration responses between the groups to particular individual characteristics and a residual 5% unexplained 'suppression' of migration activity found in three of the groups that can be regarded as a 'cultural group factor' (Q3). It is the explanation of these latter elements that lies at the heart of a true understanding of the small cultural group dimension of internal migration.

Finney, Catney, and Phillips propose that all groups have the same underlying motivations for migration, and similar overall aspirations, but ask 'what is it about ethnic identity and experience that may influence migration' (2015, p42). Indeed, they suggest a number of issues that come in to play, including: inequalities in housing, employment, and education; discrimination and exclusion; and community cohesion and a sense of belonging. Life course differences, and more particularly, different home leaving strategies between groups may also be important (Finney, 2011; Bernard, Bell, and Charles-Edwards, 2014).

Some of the differences already noted constitute reduced migratory behaviour for the smaller groups – such as in the Arab group where the HRP is aged less than 40; Chinese and Sikhs in rented accommodation; and students in all smaller groups. All of these variations may be a consequence of a positive sense of belonging to a particular neighbourhood and the presence of culturally important institutions in specific places, or negative concerns (or housing market constraints) about moving to another area. This was explored further through consideration of migration distance (Q4). For all of the smaller groups, having controlled for other variables, the likelihood of a move being more than 20km in distance is much below that for the white British group, particularly so for the Chinese, though much of that shortfall can be explained by the large number of international students in that group. Differences may also be a consequence of differing culturally-based home-leaving patterns,

which may involve a longer presence in the parental home, or extended families living together, than the white British majority demonstrates (Bernard, Bell, and Charles-Edwards, 2014). This would explain the absence of increased migration levels for cultural group students, and a flatter response to differing living arrangements, though the former is likely also to reflect educational disadvantage in the achievement of places at 'elite universities' (Smith and Jöns, 2015, p57; see also Finney, 2012), which could have consequences for graduate level migration rates in later life.

Indeed, there is only one area where there appears to be a higher propensity to migrate amongst the smaller groups than the host community – and that is that non-degree holders have a higher propensity to migrate than equivalent members of the white British group. Or rather, the reduction compared with graduate migration levels seen in the white British group is largely absent from the smaller groups. An inference of this is that the socio-economic, employment, and financial benefits of being a degree holder in the white British community are not present as extensively elsewhere.

We can thus conclude that, once the differences in the balance between the distribution of age, housing tenure, international students, and other measurable characteristics between the groups are accounted for, together with differences in the overall levels of unemployment and deprivation in the regions in which the groups are distributed, the differing migration response rates of three of the cultural groups compared with the white British majority result in a statistically measurable 'cultural group penalty' of around 5% in the odds of moving. Whilst the penalty may appear small, it applies per annum, and thus can be expected to materially affect the number of moves made by members of the three groups over a lifetime. The penalty is likely to arise from a qualitative combination of the positive attraction of living in the vicinity of other group members and culturally relevant facilities, and some negative (discriminatory) elements.

Question Q5 asks whether a penalty exists for the Jewish group. Migration levels for Jewish residents of England and Wales are (both before and after age distribution is accounted for) much closer to the white British situation – there is no cultural penalty for that group, notwithstanding its observed high levels of congregation in particular areas (Newman, 1985). The inference of this is that,

today, Jews are culturally closer to the white British group than are other groups under study here, but to what extent might this be attributable to the group's longstanding presence? Although Christianity and Judaism (and indeed Islam) are Mosaic faiths, in the early decades of significant Jewish presence in Britain, few members of the host (overwhelmingly Christian) community would have considered themselves to have much in common with the visually distinct Jewish community. Widespread anti-Semitism and barriers to entering 'the professions' in the first half of the twentieth century also bear witness to this (Alderman, 1998). Indeed over time, the Jewish group has, according to Ballard (1996, p7), 'quite deliberately sought to underemphasise both the existence and the extent of their distinctiveness, most especially in public arenas'. The passage of time, and the consequent evolution in cultural habits of majority and minority groups, and of inter-group attitudes therefore has a strong bearing on twenty-first century migration patterns. Thus the limited extent of individual visibility, and established connections between centres of Anglo-Jewry facilitating a greater degree of interchange between existing group localities, may explain the absence of a group penalty, and link it to the group's long-standing status. This group may therefore provide a 'pointer' for the future behaviour of more-recently established groups.

8. Explaining geographic patterns of small group internal migration

This chapter continues the theme of Chapter 7 – internal migration. Having examined the underlying determinants of internal migration for four small cultural groups, the focus of this chapter turns to an examination of the geographic patterns involved. In terms of the overall thesis, the focus remains on the two areas of spatial distribution change and similarities/differences between groups, and sheds further light on those matters. However the chapter does not simply focus on the pattern of movement per se. It explores the data to gain a better understanding of why the patterns found are as they are. As explained in the Abstract of the paper, which is reproduced below, two specific aspects of the geography of internal migration are investigated – the role of distance in determining inter-community moves, and the influence of individual characteristics and location of origin on the destination of moves. In examining differences between groups it identifies whether patterns established for the population as a whole are also present for the smaller groups.

The majority of this chapter reproduces a paper titled 'Explaining Geographic Patterns of Small Group Internal Migration' DOI 10.1002/psp.2078, that was submitted to Population, Space and Place in October 2016, accepted in March 2017, and published on line in April 2017. For reasons of space, text on north-south drift (included within section 8.4 of this chapter) was omitted from the published paper. For the same reason a number of tables were submitted as supplementary material; given the overall focus of the thesis, those relating to the Jewish group have been incorporated into this chapter; selected other tables are included in Appendix C.

The paper focuses on examination of migration between 2010 and 2011 making use of 2011 census outputs, for the same population groups that featured in Chapter 7. The latter part of this chapter extends and complements the paper by examining some of the trends over a longer period, by presenting assessments that make use of the ONS Longitudinal Study data, which allow migration patterns over the 1971 to 2011 period to be examined. That part of the chapter thus makes a major contribution to another of the aims of the thesis – examination of change over time.

Abstract

Internal migration plays a key role in shaping the demographic characteristics of areas. In this paper, data from the 2011 England and Wales census are used to assess the geographic patterns of migration for four small cultural groups that each constitute about 0.5% of the population – Arabs, Chinese, Jews, and Sikhs – with a white British 'benchmark' group. It examines the sensitivity of the scale of inter-community moves to distance, having controlled for other migrant characteristics, through the development of spatial interaction models. The analysis finds that, where a choice exists, Jews are more averse to making a longer move than other small groups, all of whom favour shorter moves than the white British. The paper also investigates the influence of origin location and socio-economic characteristics on the choice of migration destination using multinomial logistic regression. It finds that the influence of student status, age, qualifications and home tenure vary by group though a number of patterns are shared between groups. Finally, it probes the presence in these smaller groups of patterns found historically in the wider population, such as north-south drift and counter-urbanisation. Overall, this paper broadens the understanding of minority group migration patterns by examining, for the first time, Arabs (identified separately only in the 2011 census) and two groups based on religion (Jews and Sikhs); and by re-visiting, with new questions, the white British and Chinese groups using the latest census data.

8.1 Introduction

Internal migration, 'permanent residential relocation that involves a change of usual residence within a country' (Smith et al, 2015, p2), has, in recent decades, been highlighted many times as playing a key role in shaping the demographic characteristics of areas (Champion and Fielding, 2015; Stillwell, Rees, and Boden, 1992; Boyle, Robinson, and Halfacree, 1998; Fielding, 2012; Rees et al, 2016; Findlay and Wahba, 2013). Insofar as quantitative population geographers are concerned, research has focused on the 'why' (underlying determinants and causes) or the 'where' (the geographic patterns) of migration. Work in this field has considered the population as a whole or has focused on a number of minority ethnic groups.

This paper takes forward research in this area in two distinct ways. Firstly, it seeks to encompass both the 'where' and 'why', by exploring and understanding how distance of move and the characteristics of migrants impact on the choice of destination location, and whether the characteristics of those who move vary by geography of residential origin. Secondly, it broadens the examination of small minority groups by presenting information on Arabs, and extending the analysis beyond ethnic group to include, for the first time, two groups (Jews and Sikhs) identified by religion – a second element of cultural identity (Jacobson, 1997).

Established migratory patterns

Research carried out over the last 25 years has established some particular patterns of internal migration within England and Wales.

The 'counter-urbanisation cascade' (Champion and Atkins, 1996) describes net migration flows from Inner to Outer metropolitan areas; from conurbations to other cities; and from these areas to smaller towns and ultimately to remote rural areas (see also Champion, 2005b; Simpson and Finney, 2009; Lomax et al, 2014; Stockdale and Catney, 2014; Stockdale, 2016). A second finding is that the south east of England acts as a 'regional escalator', attracting a more than proportional share of the potentially upwardly mobile young adults, giving rise to a north - south, or north west - south east, population drift (Fielding, 1992; see also Champion, 2012; Lomax et al, 2014; Champion, Coombes, and Gordon, 2014).

A number of researchers have examined patterns found in ethnic group internal migration (Finney, Catney, and Phillips, 2015; Trevena, McGhee, and Heath, 2013). One area of research has focused on differing propensity to migrate between groups, and the extent to which this arises from differences in socio-economic characteristics. For example, Finney and Simpson (2008) found that prior to controlling for certain socio-economic characteristics the migration propensity for most non-white groups appeared higher than for white Britons, with the opposite conclusion applying once variation in characteristics had been accounted for. Catney and Simpson (2010) found a social gradient benefitting professional and managerial classes for residential mobility, irrespective of ethnic group with the exception of Chinese.

Of more direct relevance to the current study has been research into geographic patterns of movement by ethnic group. Finney and Catney (2012) noted

that relatively little is known about the impact of ethnicity on internal migration, echoing a concern raised by Stillwell, Hussain, and Norman (2008). Whilst the 'absolute geographies of migration differ between ethnic groups because they start from different places' (Finney, Catney, and Phillips, 2015, p36) there is, nevertheless, a consistency in the findings of various studies. The primary finding is one of movement away from settlement areas and away from areas of the groups' highest concentrations (Champion, 1996; Rees and Butt, 2004; Simpson and Finney, 2009; Stillwell, 2010; Stillwell and McNulty, 2012), with the Chinese group frequently showing exceptional behaviour. These patterns at a national level have also been found in studies examining some religion-based groups in individual cities (Muñoz, 2011; Gale, 2013).

An important finding for minority groups has been increased levels of migration effectiveness – how effective migration is in changing the population of an area – measured as net migration divided by the sum of in and out migration (Bell et al, 2002; Stillwell and Hussain, 2008). Other researchers have noted differences in likelihood of moving to particular destinations (Manley and Catney, 2012) and in the length of moves undertaken (Finney and Simpson, 2008) by various non-white ethnic groups compared with a white, or white British, control group. However, all of these results predate the release of relevant data from the 2011 census.

Focus and aims of this paper

In addressing cultural groups, this study differentiates itself from other studies that have focused on ethnic group alone. Arabs, Chinese, Jews, and Sikhs are the only distinct cultural categories (that is, excluding 'mixed' and 'other' groupings) that each constitute around 0.5% of the England and Wales population at the 2011 census. These smaller groups, most of whom having previously received limited attention, have been chosen for examination in this paper for a number of reasons:

- Unlike larger minority groups (and the dominant white British group), their small size has resulted in spatial distributions that are either geographically concentrated in a small number of localities – for example, the Jewish group (Newman, 1985), or widely distributed – for example, the Chinese group (Catney, 2015c), but not both.
- Although religion and ethnic grouping can be seen as simply two aspects of overall cultural identity (Aspinall, 2000b), the benefits of group congregation

may manifest themselves in different ways between these two categories (Peach, 1996b; Phillips, Cathy, and Ratcliffe, 2007).

- Despite their similarity in size, these four groups demonstrate different mixes of socio-demographic characteristics - for example, age profile, academic qualification levels, and UK or overseas country of birth (Sapiro, 2016a).

All of the above sources of difference between each of these groups, and between these groups as a whole and the white British majority, can be expected to give rise to different patterns of migration geography or migration distance. The focus of this paper is to investigate and understand the extent to which this is the case.

It should be noted that 77% of individuals who identified themselves as Jewish in the 2011 England and Wales census ticked the white British ethnic group option. However, despite the overlap, the Jewish group is distinct as it has a concentrated spatial distribution and a different socio-economic profile to the wider white British group in a number of key areas relating to migration propensity – for example, the level of self-employment; degree level qualifications, and professional and technical employment (Sapiro, 2016b; Reuschke, 2014). Conversely, as Jews make up only 0.4% of all white Britons, the inclusion of Jews within the white British category has a negligible impact on the migration patterns for that group. All other group overlaps – for instance, Chinese Jews or Arab Sikhs – are negligible in size.

This paper addresses three questions:

1. What is the sensitivity of the scale of inter-community moves to the distance involved in making those moves, and does this vary between cultural groups?
2. How strong are the influences of origin location and migrant demographic and socio-economic characteristics in determining the choice of destination location, and how does this vary between groups?
3. Do the resulting migration patterns for the groups illustrate aspects such as counter-urbanisation, north-south drift, dispersal, and migration effectiveness, previously found for the population as a whole or for larger ethnic groups?

Sections of this paper describe the development of spatial interaction models associated with addressing the first research question, and multi-nominal logistic

regression models in respect of the second question. These analyses provide the backdrop to an examination of migration patterns mentioned in the third question.

The analysis makes use of routinely available census tables plus two, more specialised, outputs. First are the safeguarded local authority Special Migration Statistics (SMS) religion and ethnic group files – basically a 348 x 348 matrix for each religion and ethnic group, indicating the number of moves by individuals between each local authority district in England and Wales in 2010-11. The second source are the safeguarded 2011 individual microdata – a 10% sample of anonymised census returns providing regional origin, regional or local authority destination, and distance of move (or indicating no move made); various socio-economic, gender, age, and student status information is included.

The research presented here looks at the geographic pattern of moves; it contributes to research in this field by presenting, for the first time, nationwide information on the geography of migration patterns for Jews, Sikhs and Arabs. Although analysis in various forms has been presented previously for Chinese (and the white British group, which is used as a benchmark in this research), those assessments pre-date the release of information from the 2011 census, and this paper adds new material to the discussion of these groups, by addressing questions not previously asked.

8.2 The impact of distance on inter-community moves

So what is the influence of distance on the choice of destination for moves between congregations or agglomerations of members of the groups? That is, having controlled for variations in characteristics of people and places, how strongly does the distance to competing destinations influence the choice of destination? Two stages in the process are needed; first is a mechanism to identify group communities and the distance and numbers of moves taking place between them and, secondly, the development of a modelling technique to control for other influences on moving.

'Communities' have been identified through an assessment based on consideration of group populations and population densities. 'Cliffs and valleys' evident in the mapping of population density of the groups were used to delineate

communities (defined initially as groups of contiguous lower layer super output areas[18], but assessed as whole local authorities, or groups of local authorities, to allow use of the safeguarded SMS data); all areas with a group population in excess of about 2000 persons were identified. This threshold was large enough to ensure some form of social cohesion for the group would exist; for example, each of the localities identified for the Sikh group and Jewish group includes at least one gurdwara or synagogue (HM Passport Office, 2016); and 60% to 75% of all 2010-11 England and Wales internal group migration took place within or between these localities. The numbers of communities identified were: Arab and Jewish, 15 each; Chinese, 26; and Sikh, 18. The mapping was also used to identify a centroid for the community, from which the inter-community (Euclidian) distances were calculated.

A different approach had to be adopted for the white British group. As this group represents the majority of the population, the concept of a relatively small number of key localities encompassing the majority of the group population, or group population moves, cannot be applied. The small cultural groups are primarily located in the major conurbations and other large urbanised areas. For consistency the white British 'communities' were defined to focus only on densely populated areas, so as to reduce the possibility that any differences in behaviour might arise from rural/urban mix differences between the groups. The white British 'communities' were thus represented by London, the six metropolitan county areas, and the thirteen individual urban local authorities that each accommodate over 180,000 white British residents. (For an earlier example of the development of an internal migration model for England and Wales using data only for the most populous localities see Fotheringham and O'Kelly, 1989, pp98-106). Table 8.1 shows the 2010-11 inter-community moves for the Jewish group; tabulations showing the moves for the other groups, together with other supporting tables for this and other parts of the paper are included in Appendix C.

The next step was to develop an appropriate model to allow the impact of distance to be isolated. Spatial interaction modelling (Fotheringham and O'Kelly, 1989) has a long history (Reilly, 1929; Zipf, 1949; Lowry, 1966), but it was Wilson

[18] lower layer super output area (LSOA) – a census reporting area, defined by the Office for National Statistics, each containing about 1500 residents in total.

Table 8.1 Jewish inter-community moves 2010-11

Origin Jewish community	Destination Jewish community: NW & W London	Manchester	Hackney	NE London	S & SW London	Leeds	Gateshead	Brighton	Birmingham	Liverpool	Southend	Bournemouth	Nottingham	Oxford	Cambridge	Total
NW & W London		150	297	65	275	101	74	60	183	19	10	70	168	89	65	1626
Manchester	208		24	8	12	56	56	1	35	52	0	1	44	5	4	506
Hackney	323	53		22	37	2	34	3	0	3	1	5	0	1	0	484
NE London	170	5	22		24	19	1	0	8	3	14	10	19	1	6	302
S & SW London	237	7	41	13		7	0	14	1	3	0	2	4	7	2	338
Leeds	112	57	5	8	8		7	1	8	4	4	2	8	2	4	230
Gateshead	34	61	6	0	1	6		0	1	0	0	0	1	1	1	112
Brighton	46	2	5	3	9	5	1		0	0	0	1	0	2	4	78
Birmingham	84	19	0	12	4	6	0	0		1	0	4	3	1	1	135
Liverpool	24	14	1	0	3	7	0	1	8		0	0	2	0	0	60
Southend	24	1	2	4	0	1	0	1	2	4		0	1	0	0	40
Bournemouth	28	4	3	4	1	0	0	0	4	0	0		0	0	0	44
Nottingham	71	21	2	10	3	5	2	0	6	0	0	3		1	2	126
Oxford	52	2	2	0	6	2	0	5	4	1	0	0	1		1	76
Cambridge	74	0	2	3	7	2	1	0	5	0	0	0	1	1		96
Total	1487	396	412	152	390	219	176	86	265	90	29	98	252	111	90	4253

(1967, 1971) who highlighted the potential for these mathematical theories in modelling flows between places, by constraining matrix cell values to match known row and/or column totals. These models are frequently referred to as 'gravity' models, due to the similarity of the formulation of those models with the classic Newtonian gravitational force model.

An unconstrained spatial interaction model[19] (see Fotheringham and O'Kelly, 1989, Tiefelsdorf and Boots, 1995) can explain the link between the underlying

[19] In general terms such a model can be expressed as

$$T_{ij} = k v_i^{\mu} w_j^{\alpha} c_{ij}^{-\beta}$$ (Fotheringham and O'Kelly, 1989, p44)

or, transformed into an additive form, as

$$\ln(T_{ij}) = \ln(k) + \mu \ln(v_i) + \alpha \ln(w_j) - \beta \ln(c_{ij})$$

where T_{ij} is the number of moves from area i to area j; v_i is the value of a characteristic of area i; w_j is the value of a characteristic of area j; C_{ij} is the resistance to moves (distance) between areas i and j; k, μ, α, and β are coefficients which must be derived by calibrating the equation. Additional terms can be added to represent other characteristics of area i and j.

characteristics that influence the pattern of movement and the frictional impact of distance on the propensity to move from place to place. The model would need to identify, and then control for, the characteristics that underpin inter-community moves, so that the impact of distance can be properly identified. The numbers of group members falling into each of seven characteristics were identified for each locality: three age ranges; student status (yes/no); degree holder (yes/no); living in rented accommodation (yes/no); and households without dependent children (yes/no). These were based on the variables which Sapiro (2016a – *see Chapter 7 of this thesis*) had found to influence propensity to migrate for these groups. Additionally, the total population and total number of students in each locality were determined. The inclusion of the latter two variables allows for the possibility of the overall size of a locality, and its popularity as a place of study more generally, to be influential in destination choice.

As the distribution of inter-community trips is highly skewed, and the variance of the model differed from the mean, negative binomial regression using a logarithmic link function and maximum likelihood estimation was adopted (Flowerdew, 2010). Separate models were developed for Arab, Chinese, Jewish, Sikh, and white British internal migrations, using 2011 SMS flows and characteristics taken from standard census output tables, aggregated into the communities that had been identified for each group. The modelling covered only moves internal to England and Wales and, as is standard practice for this type of model, excluded intra-community moves.

Each model had the potential to include nineteen covariates – the logarithm of the nine characteristics mentioned above, each calculated for origin and destination of the trip, plus the trip distance. Those making least contribution to the model (based on the significance level calculated for that variable's contribution to the model) were progressively removed, until either all the variables still retained were making a contribution significant at the 5% level, or the point was reached when further variable reduction would lead to a worsening in both AIC and BIC

goodness of fit values[20]. Model output is shown in Table 8.2. The AIC and BIC values are not shown in the table as they cannot be compared between datasets, and the individual values alone do not have a meaningful interpretation. In order to give some appreciation of the quality of models, the table does include a value for the coefficient of determination (R^2) and a sum of squares F test; these give an indication of the amount of the variation in the number of movements that the model explains, and the goodness of fit of the model output to the census-observed inter-community flows. These figures (which cannot be derived for negative binomial models) relate to complementary ordinary least squares regression models – that is, using logged values of the dependent and relevant covariates used in the final negative binomial models. In all cases this proxy for model fit is significant at the 0.1% level, and the models explain around 80% of the variation in trip numbers for most of the small groups, and 90% for the white British group – a very high proportion.

The table indicates that the coefficient applicable to the distance covariate for the small cultural groups falls within a relatively narrow range. For a clearer understanding of the impact of the coefficient, we can envisage a set of characteristics that results in 100 moves taking place between two locations that are 10km apart, and consider how many trips might result if those localities were further apart (that is, all the origin and destination characteristics are held constant) – see Figure 8.1. If the separation was 250km, the mean number of moves would be Jewish 14; Sikh and Arab 17; Chinese 21; and white British 38. The results for the minority groups are close to the Newtonian inverse square relationship - the 'gravity' line shown on Figure 8.1.

The model parameters as a whole describe the overall relationship between origin and destination characteristics, spatial configuration of communities, and the level of moves that occur. The distance coefficients that have been determined can be thought of as measuring the steepness of the relationship between trip numbers and distance. That the Jewish group has the largest distance coefficient means there

[20] Statistics for measuring goodness of fit for categoric variable models include: minus two log likelihood (-2LL), Akaike Information Criterion (AIC), and Schwarz Bayesian Information Criterion (BIC).

Table 8.2 Spatial interaction model parameters

[this table extends onto the next page]

Arab Model	B		Std. Error	Exp(B)	95% Wald CI	
Parameter (logged)					Lower	Upper
Intercept	-7.919	***	1.173	0.000	0.000	0.004
Distance (km)	-0.609	***	0.060	0.544	0.483	0.612
Group pop at dest age 60plus	-0.229	***	0.061	0.795	0.705	0.896
Total students at orig	0.325	***	0.083	1.384	1.177	1.628
Total students at dest	0.178	*	0.080	1.195	1.021	1.398
Group hholds with no dep ch at orig	0.410	***	0.056	1.506	1.350	1.680
Group hholds with no dep ch at dest	0.914	***	0.104	2.495	2.034	3.061
Scale parameter	1.08		Negative binomial parameter			0.32
Likelihood Ratio Chi-Square	285 (6df)	***	R^2 0.61	F	53	***

Chinese model	B		Std. Error	Exp(B)	95% Wald CI	
Parameter (logged)					Lower	Upper
Intercept	-7.751	***	0.526	0.000	0.000	0.001
Distance (km)	-0.719	***	0.027	0.487	0.462	0.514
Group pop at origin age under 25	0.625	***	0.170	1.869	1.340	2.605
Group pop at origin age 25-59	0.666	***	0.109	1.947	1.573	2.408
Group pop at dest age 25-59	0.750	***	0.121	2.117	1.670	2.683
Group pop at dest age 60 plus	-0.418	***	0.089	0.658	0.553	0.783
Group students at origin	0.168	**	0.052	1.183	1.069	1.309
Group students at dest	0.167	***	0.044	1.182	1.084	1.289
Group renters at dest	0.304	**	0.098	1.355	1.118	1.642
Group hholds with no dep ch at orig	-0.664	***	0.165	0.515	0.372	0.712
Scale parameter	1.00		Negative binomial parameter			0.17
Likelihood Ratio Chi-Square	1953 (9df)	***	R^2 0.76	F	226	***

Jewish model	B		Std. Error	Exp(B)	95% Wald CI	
Parameter (logged)					Lower	Upper
Intercept	-8.903	***	1.280	0.000	0.000	0.002
Distance (km)	-0.491	***	0.067	0.612	0.536	0.698
Group pop at origin age under 25	0.742	***	0.113	2.100	1.683	2.619
Group pop at origin age 25-59	-1.158	***	0.301	0.314	0.174	0.567
Group pop at origin age 60 plus	0.474	**	0.145	1.607	1.208	2.137
Group pop at dest age under 25	0.883	***	0.123	2.418	1.900	3.078
Group pop at dest age 25-59	-1.823	***	0.334	0.162	0.084	0.311
Group pop at dest age 60 plus	0.641	***	0.147	1.899	1.423	2.535
Total pop at destination	0.250	*	0.122	1.284	1.011	1.631
Group degree holders at origin	0.764	***	0.167	2.147	1.548	2.976
Group degree holders at dest	0.926	***	0.215	2.524	1.655	3.850
Scale parameter	0.98		Negative binomial parameter			0.28
Likelihood Ratio Chi-Square	430 (10df)	***	R^2 0.79	F	74.3	***

Sikh Model	B		Std. Error	Exp(B)	95% Wald CI	
Parameter (logged)					Lower	Upper
Intercept	-7.883	***	0.703	0.000	0.000	0.001
Distance (km)	-0.586	***	0.041	0.557	0.514	0.603
Group pop at origin age 60 plus	0.418	***	0.041	1.519	1.401	1.647
Total pop at origin	0.271	***	0.068	1.311	1.147	1.498
Group pop at dest age under 25	1.384	***	0.305	3.990	2.195	7.252
Group pop at dest age 25-59	-0.762	**	0.263	0.467	0.279	0.781
Group students at origin	0.137	***	0.031	1.147	1.079	1.220
Group students at dest	0.145	**	0.050	1.156	1.049	1.274
Scale parameter	0.98		Negative binomial parameter			0.10
Likelihood Ratio Chi-Square	653 (7df)	***	R^2 0.81	F	181	***

Table 8.2 continuation

White British Model	B		Std. Error	Exp(B)	95% Wald CI	
Parameter (logged)					Lower	Upper
Intercept	-10.302	***	0.773	0.000	0.000	0.000
Distance (km)	-1.198	***	0.040	0.302	0.279	0.326
Group pop at origin age 25-59	4.100	***	1.021	60.354	8.166	446.083
Group pop at origin age 60 plus	2.241	***	0.545	9.404	3.229	27.388
Group pop at dest age 25-59	4.273	***	0.952	71.766	11.105	463.791
Group pop at dest age 60 plus	1.904	***	0.557	6.711	2.253	19.993
Group students at origin	0.177	***	0.044	1.193	1.096	1.300
Total students at dest	0.234	***	0.047	1.264	1.153	1.385
Group degree holders at origin	1.424	***	0.175	4.155	2.947	5.857
Group degree holders at dest	1.718	***	0.179	5.574	3.923	7.921
Group renters at origin	2.936	***	0.448	18.848	7.833	45.351
Group renters at dest	3.506	***	0.458	33.322	13.582	81.751
Group hholds with no dep ch at orig	-9.962	***	1.676	0.000	0.000	0.001
Group hholds with no dep ch at dest	-10.728	***	1.641	0.000	0.000	0.001
Scale parameter	1.07		Negative binomial parameter			0.18
Likelihood Ratio Chi-Square	1011 (13df)	***	R^2 0.92	F	306	***

Significance level: * 5% ** 1% *** 0.1%

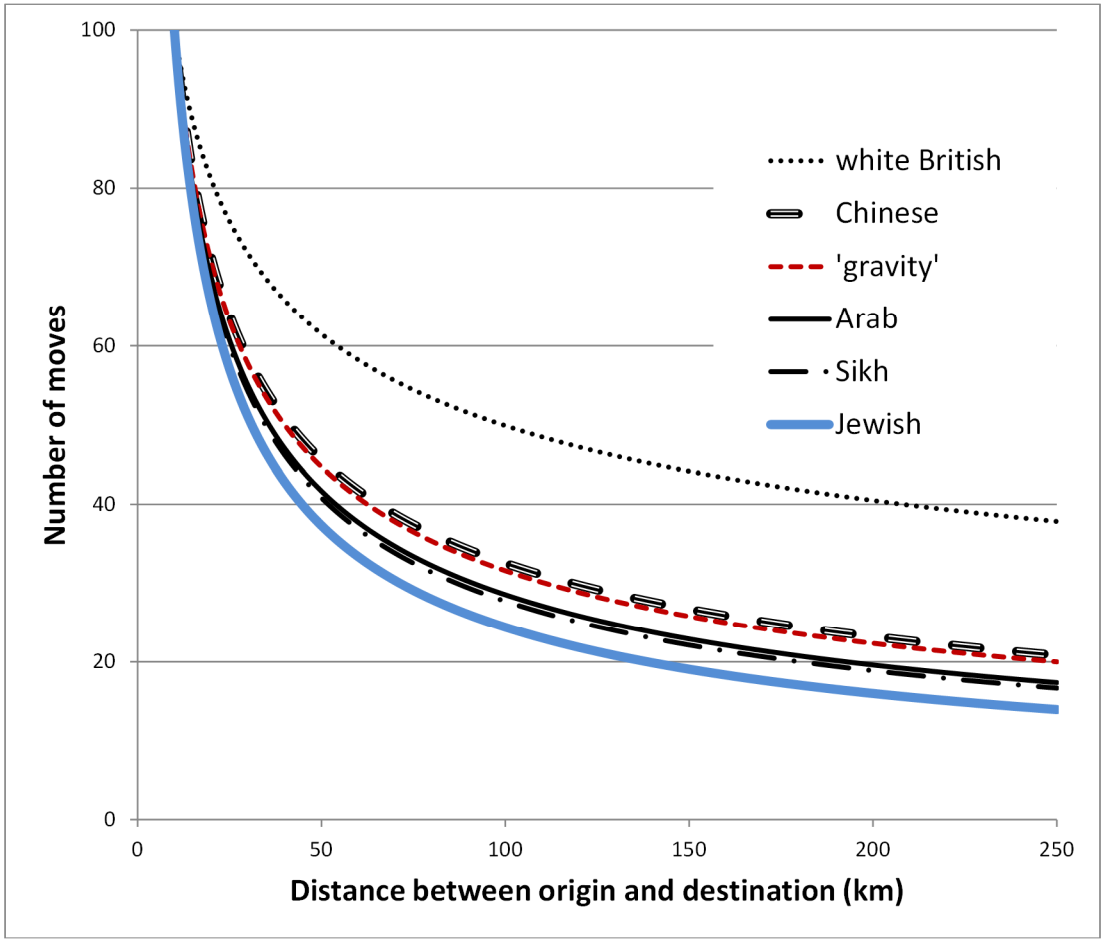

Figure 8.1 Impact of distance coefficient on number of moves

is a steeper relationship between numbers of moves and distance of separation between communities for that group than for the other small groups and particularly so when compared with the white British group.

In summary, for all groups, for matching sets of characteristics, people will tend to favour shorter moves over longer ones. As regards research question 1, we have established that where there is a choice of destinations meeting a set of characteristics, Jews are slightly more likely than Sikhs and Arabs, and significantly more likely than Chinese to reject a longer move in favour of a shorter one. All of these smaller groups more strongly prefer shorter inter-community moves than does the white British majority.

8.3 Underlying influences on regional migration

The previous section examined only inter-community moves, but is there an impact of geography on moves more generally? Can we identify whether the place (region) of origin of a move, and the socio-economic/demographic characteristics of migrants, has an influence on the place (region) of destination of the move, and provide an answer to the second research question?

Multinomial logistic regression was the appropriate form of model to adopt – with region of destination as the multinomial outcome. One of the difficulties with this type of regression is finding an appropriate balance between the number of independent variables to be included, and the number of categories to be adopted within each of these variables, whilst optimising the goodness of fit of the final model, and minimising the number of cells for which no observations would be available (Field, 2009). Ultimately, the solution adopted was to produce three models of destination choice - one for each origin super-region (London; SE & E England; and elsewhere in England and Wales), with student status, age, highest qualification, and home tenure as the four categorical covariates. Separate families of models were produced for each cultural group. An example of the model output (using the Jewish group) is shown in Table 8.3; for other groups, see Appendix C.

By applying the logistic regression equations derived by these models, with relevant values of the parameters inserted, the influence of a characteristic (having controlled for the other characteristics) on the probability of selecting a particular destination region can be determined. The results of this process are shown in Table 8.4. Underscoring of values in the table indicates that the 95% confidence interval

Table 8.3 Multinomial logistic regression parameter estimates (Jewish movers 2010-11)

super region of destination		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
	Movers originating in London						
London	Intercept	2.06	0.55	***			
compared with	Not student	2.53	0.29	***	12.58	7.10	22.27
Rest of E & W	age up to 24	-1.20	0.32	***	0.30	0.16	0.56
	age 60 and over	-1.87	0.39	***	0.15	0.07	0.33
	intermediate quals	-1.17	0.32	***	0.31	0.17	0.58
	degree qualified	-0.65	0.36		0.52	0.26	1.05
	home not owned	0.02	0.29		1.02	0.58	1.80
SE & E	Intercept	1.90	0.66	**			
compared with	Not student	0.79	0.37	*	2.20	1.06	4.56
Rest of E & W	age up to 24	-1.35	0.39	***	0.26	0.12	0.55
	age 60 and over	-0.97	0.44	*	0.38	0.16	0.89
	intermediate quals	-0.81	0.38	*	0.45	0.21	0.94
	degree qualified	-0.86	0.43	*	0.42	0.18	0.98
	home not owned	-0.95	0.33	**	0.39	0.20	0.74
	Movers originating in SE & E England						
London	Intercept	0.84	1.02				
compared with	Not student	1.51	0.51	**	4.53	1.67	12.27
Rest of E & W	age up to 24	0.27	0.50		1.31	0.49	3.50
	age 60 and over	0.50	0.70		1.65	0.42	6.47
	intermediate quals	-0.78	0.59		0.46	0.14	1.47
	degree qualified	-0.03	0.61		0.97	0.29	3.24
	home not owned	-0.96	0.50		0.39	0.14	1.03
SE & E	Intercept	3.31	0.95	**			
compared with	Not student	1.00	0.46	*	2.70	1.09	6.70
Rest of E & W	age up to 24	-0.92	0.47		0.40	0.16	1.01
	age 60 and over	0.04	0.67		1.04	0.28	3.83
	intermediate quals	-0.82	0.56		0.44	0.15	1.31
	degree qualified	-1.06	0.59		0.35	0.11	1.10
	home not owned	-1.17	0.48	*	0.31	0.12	0.80
	Movers originating in the Rest of England & Wales						
London	Intercept	-5.21	0.70	***			
compared with	Not student	1.38	0.38	***	3.97	1.88	8.39
Rest of E & W	age up to 24	1.45	0.31	***	4.26	2.31	7.85
	age 60 and over	0.10	0.50		1.11	0.42	2.94
	intermediate quals	0.71	0.46		2.03	0.82	5.03
	degree qualified	2.26	0.43	***	9.62	4.17	22.21
	home not owned	-0.09	0.28		0.91	0.53	1.58
SE & E	Intercept	-4.84	1.00	***			
compared with	Not student	1.24	0.61	*	3.46	1.04	11.53
Rest of E & W	age up to 24	0.73	0.45		2.08	0.86	5.03
	age 60 and over	0.21	0.61		1.23	0.37	4.07
	intermediate quals	-0.08	0.61		0.92	0.28	3.02
	degree qualified	1.29	0.53	*	3.63	1.29	10.24
	home not owned	-0.03	0.40		0.97	0.44	2.11

Reference covariates category: student, age 25-59, home owner, with no qualifications
Significance level: *** 0.1% ** 1% * 5%

Table 8.4 Probability of selecting a particular destination region

Origin	Destination	Student status: student	Student status: not student	Age: up to 24	Age: 25 to 59	Age: 60 and over	Qualification level: no quals	Qualification level: inter-mediate quals	Qualification level: degree qualified	Home tenure: home owned	Home tenure: home not owned
Arab Residents											
London	London	**0.79**	**0.93**	0.92	0.92	0.92	**0.95**	0.90	0.90	0.88	0.92
	SE & E	**0.06**	**0.03**	0.03	0.04	0.04	*0.02*	0.04	*0.05*	0.05	0.03
	Elsewhere	0.14	0.04	0.05	0.04	0.04	0.03	0.05	0.04	0.07	0.04
SE & E	London	**0.07**	**0.19**	0.15	0.11	0.11	0.06	0.16	0.13	0.12	0.13
	SE & E	**0.67**	**0.75**	0.73	0.76	0.76	0.73	0.74	0.74	0.79	0.74
	Elsewhere	0.26	0.07	0.12	0.13	0.13	0.21	0.09	0.13	0.09	0.13
Elsewhere	London	0.02	0.07	0.08	0.03	0.03	*0.02*	0.05	*0.10*	0.01	0.05
	SE & E	0.02	0.03	0.04	0.02	0.02	0.03	0.04	0.03	0.05	0.03
	Elsewhere	0.95	0.90	0.88	0.95	0.95	0.96	0.91	0.88	0.94	0.92
Chinese Residents											
London	London	**0.83**	**0.86**	0.85	0.86	0.86	*0.81*	0.84	*0.87*	0.84	0.85
	SE & E	0.10	0.09	0.09	0.10	0.10	**0.14**	0.09	0.09	**0.13**	**0.08**
	Elsewhere	0.07	0.05	0.06	0.05	0.05	0.05	0.07	0.04	0.03	0.06
SE & E	London	**0.13**	**0.19**	0.19	0.13	0.10	**0.08**	0.15	0.20	0.17	0.16
	SE & E	**0.75**	**0.69**	0.63	**0.80**	0.66	**0.85**	0.71	0.67	0.75	0.70
	Elsewhere	0.12	0.13	0.18	0.07	0.24	0.06	0.14	0.12	0.08	0.14
Elsewhere	London	**0.04**	**0.07**	0.07	0.03	0.02	**0.01**	0.05	0.10	0.03	0.06
	SE & E	0.04	0.06	0.05	0.04	0.13	**0.02**	0.05	0.08	0.04	0.05
	Elsewhere	0.92	0.87	0.88	0.92	0.85	**0.97**	0.90	0.82	0.92	0.89
Jewish Residents											
London	London	**0.52**	**0.89**	**0.85**	**0.89**	**0.70**	0.88	**0.81**	0.88	**0.81**	**0.89**
	SE & E	**0.26**	**0.08**	0.08	0.09	**0.18**	0.09	*0.12*	*0.08*	**0.16**	**0.07**
	Elsewhere	**0.23**	**0.03**	0.07	*0.02*	*0.12*	*0.02*	*0.07*	0.04	0.04	0.04
SE & E	London	**0.17**	**0.27**	**0.38**	**0.17**	**0.25**	0.19	0.19	**0.38**	0.24	0.26
	SE & E	0.68	0.67	**0.53**	0.77	0.70	0.77	0.73	**0.55**	**0.73**	**0.64**
	Elsewhere	0.15	0.05	0.09	0.05	0.05	0.04	0.08	0.07	0.04	0.10
Elsewhere	London	0.03	0.12	0.13	0.03	0.04	0.03	0.05	**0.21**	0.08	0.07
	SE & E	0.02	0.05	0.04	0.02	0.03	0.03	0.02	0.07	0.04	0.03
	Elsewhere	0.95	0.83	0.83	0.94	0.93	*0.95*	0.92	*0.72*	0.89	0.89
Sikh Residents											
London	London	**0.62**	**0.80**	0.75	*0.80*	*0.66*	**0.87**	0.74	0.74	**0.66**	**0.84**
	SE & E	0.19	0.14	0.15	0.14	0.14	**0.09**	0.18	0.15	**0.24**	**0.09**
	Elsewhere	0.19	0.07	0.10	0.07	0.20	0.04	0.08	0.10	0.10	0.06
SE & E	London	0.11	0.12	0.14	0.10	0.08	**0.05**	**0.10**	**0.22**	**0.08**	**0.18**
	SE & E	0.69	0.78	0.71	0.80	0.84	**0.92**	0.74	0.62	**0.80**	**0.72**
	Elsewhere	0.20	0.10	0.15	0.09	0.08	0.03	0.16	0.16	0.12	0.10
Elsewhere	London	0.03	0.04	0.06	0.03	0.04	*0.02*	0.03	*0.09*	**0.03**	**0.06**
	SE & E	0.03	0.03	0.04	0.02	0.07	*0.01*	0.03	*0.09*	0.03	0.04
	Elsewhere	0.94	0.93	0.90	0.95	0.89	*0.97*	0.94	*0.81*	0.95	0.90
White British Residents											
London	London	**0.55**	**0.73**	**0.70**	**0.73**	**0.56**	**0.70**	**0.67**	**0.74**	**0.58**	**0.78**
	SE & E	**0.24**	**0.20**	0.19	0.20	**0.29**	0.23	0.23	**0.17**	**0.31**	**0.15**
	Elsewhere	**0.21**	**0.08**	**0.10**	**0.07**	**0.15**	**0.06**	0.09	0.09	**0.11**	**0.07**
SE & E	London	**0.06**	**0.04**	**0.05**	0.04	0.03	**0.02**	**0.04**	**0.12**	**0.03**	**0.05**
	SE & E	**0.66**	**0.88**	**0.84**	**0.88**	**0.82**	**0.92**	**0.86**	**0.75**	0.86	0.86
	Elsewhere	**0.28**	**0.08**	**0.11**	**0.08**	**0.15**	**0.06**	**0.10**	**0.13**	**0.11**	**0.09**
Elsewhere	London	0.01	0.01	0.01	0.01	0.01	0.00	0.01	**0.05**	0.01	0.01
	SE & E	0.04	0.03	0.04	**0.02**	0.04	0.02	0.03	**0.07**	0.03	0.03
	Elsewhere	0.95	0.96	0.94	**0.97**	0.95	**0.98**	**0.96**	**0.88**	0.96	0.96

Bold indicates no overlap of 95% confidence interval with that of other categories

Italic indicates no overlap of 95% confidence interval with that of other italicised category

for that entry does not overlap with that for one or more other entries; note that this is a robust method of identifying differences in migration probability between categories that are significant at the 5% level (Cumming and Finch, 2005). The main distinctions in destination choice found for each group can be summarised as follows:

- White British: students, persons aged over 60, and home owners are far less likely to stay in London than those in other categories; and students originating in SE & E England are far more likely to move away from that region than non-students.
- Arab: As with the white British group, London students are far less likely than non-students to remain in the capital; and for students based in SE & E England, a move to the remainder of England and Wales is more likely than a move to London
- Chinese: persons without qualifications based outside of London are more likely to move within their super-region than persons with qualifications; and individuals aged 25 to 59 based in SE & E England are less likely to leave the region than those in other age bands.
- Jewish: around one quarter of London-based students choose moves to each of SE & E England, and the rest of England and Wales, compared with far fewer than 10% of non-students making each of those destination choices; Jewish degree holders living outside of London are considerably more likely than their less qualified neighbours to make a move to London.
- Sikh: London-based students are far more likely to move to the remainder of England and Wales than non-students; home owners are rather less likely than others to move between super-regions; degree holders based in SE & E England are much more likely than others to move to London.

Overall, the analysis demonstrates that the relative importance of student status, age, qualifications, and home tenure in influencing choice of destination region for a given region of origin varies quite noticeably across the various groups. The following paragraphs summarise the key high-level findings.

Outside of London and SE & E England, typically 9 out of 10 moves are within super region; notable exceptions are degree-qualified Chinese (82%), Sikhs (81%), and Jews (72%). Four out of five London-based movers remain within

London; groups where the proportion falls below 60% include: white British students, over 60s, and home owners (numerically a very large group); and Jewish students.

The white British group demonstrates a strong counter-urbanisation tendency, as demonstrated by over one-fifth of London-based movers relocating to SE & E England. Such levels are absent for the Arab and Chinese groups, and are limited to those aged over 60 for the Jewish group, and home-owning Sikhs.

The south east of England 'economic escalator' effect (Fielding, 1992) is still a strong feature of inter-regional migration, with typically three to six times the proportion of degree holders than those with no qualifications based outside of London and SE & E England moving to those parts of England and Wales for all groups. As these data are only a 2010-11 snapshot – we do not know the previous migration history of the individuals involved – it is not possible to confirm the 'stepping off the escalator' (and returning north) theory investigated by Champion (2012). However it is certainly true to say that for white British persons based in London or the SE & E of England, those aged over 60 have a statistically greater likelihood of moving to a location beyond London and SE & E England than those in younger age groups.

8.4 Movement patterns

Section 8.1 of the paper has drawn attention to a number of migratory patterns that have been identified for the population as a whole – such as counter-urbanisation, north-south drift and the SE England economic escalator effect. That section also documented some patterns found in larger minority groups in 2001 census data – for example, increased levels of migration effectiveness, and movements away from areas of the groups' highest concentrations. Building on the aspects summarised at the end of Section 8.3, can we establish the extent to which the movement patterns discussed in section 8.1 manifest themselves in small group migration within England and Wales?

London area counter-urbanisation

Counter-urbanisation has been considered in detail by investigating the level of moves between concentric circles around London. (Note that the numbers of movers are too small to extend this analysis to other cities, even in combination).

Seven 'rings' of local authorities were established, each approximately 15km deep - Circle 1 is inner London; outer London is found in Circle 2; and Circle 7 includes (for example) Oxford and Cambridge. The same circles have been applied to all groups – see Table 8.5. Note that the table includes only moves wholly within the seven circle area.

The pattern of outward movement is very clear for the white British. For Jews and Sikhs there is a slight 'throttle' on the outward movement, with a focus on circles 3 and 4, and a lower level of onward dispersion into circles 5 to 7. The Chinese (and Arab) pattern implies some disillusionment with distant living and a move back to outer London.

Table 8.5 London circles and counter-urbanisation

Net migration increase and effectiveness 2010-2011

	Arab		Chinese		Jewish		Sikh		White British	
London Circle	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff
inner London	-210	-0.07	-90	-0.02	-280	-0.09	-170	-0.13	-7790	-0.07
circle 2	160	0.05	340	0.06	-130	-0.03	-880	-0.27	-15930	-0.13
circle 3	60	0.07	10	0.00	220	0.12	420	0.21	-790	-0.01
circle 4	70	0.11	50	0.03	40	0.06	420	0.24	2110	0.02
circle 5	50	0.12	-70	-0.06	-10	-0.02	90	0.15	5580	0.06
circle 6	-50	-0.14	-20	-0.02	60	0.13	50	0.15	5530	0.07
circle 7	-80	-0.15	-210	-0.10	90	0.14	70	0.18	11290	0.14

Note: Net mig - net migration; Mig eff - migration effectiveness.
Source: Author calculations based on 2011 SMS tables

Regional migration effectiveness

The suggestion has been made that, in general, places with large outflows of migrants also have large inflows, reducing the overall 'migration effectiveness' but that this is less so for minority groups (Stillwell and Hussain, 2008). Table 8.6 shows net inter-regional migration flows and migration effectiveness for the groups.

The most accurate picture of the overall impact on group distribution is provided when the data are weighted by the group's overall size in each region, as summarised at the foot of the table. These figures indicate a broadly similar level of regional migration effectiveness for white British, Chinese, and Arab groups. The Jewish and Sikh groups show a higher level of migration effectiveness than the other groups for the groups as a whole. If the individual regional rates were to persist over a prolonged period, they would indicate that internal migration would have a noticeable impact on regional distribution of the groups.

Table 8.6 Regional migration effectiveness

Net migration increase and effectiveness 2010-11

	Arab		Chinese		Jewish		Sikh		White British	
	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff	Net mig	Mig eff
North East	-50	-0.10	100	0.08	80	0.19	10	0.03	3530	0.06
North West	-160	-0.11	-10	0.00	-80	-0.06	70	0.10	-4950	-0.04
Yorks & Humber	70	0.04	-180	-0.06	30	0.04	-60	-0.07	4470	0.03
East Midlands	100	0.08	120	0.04	160	0.24	200	0.10	1500	0.01
West Midlands	-30	-0.02	-10	0.00	160	0.24	-210	-0.07	-8120	-0.06
East of England	-30	-0.02	-650	-0.15	160	0.06	180	0.11	-4120	-0.02
Inner London	20	0.00	850	0.09	-280	-0.07	-20	-0.01	5220	0.03
Outer London	290	0.07	150	0.02	-510	-0.09	-850	-0.19	-28200	-0.15
South East	-110	-0.05	-80	-0.01	120	0.08	580	0.18	5080	0.02
South West	-230	-0.27	-280	-0.10	140	0.19	60	0.11	18440	0.10
Wales	120	0.16	-10	-0.01	30	0.14	50	0.18	7160	0.09
Group Population weighted average										
Mean (absolute)		0.06		0.05		0.09		0.12		0.05
Standard deviation		0.05		0.05		0.09		0.16		0.03

Note: Net mig - net migration; Mig eff - migration effectiveness.

Source: Author calculations based on 2011 SMS tables

North-south drift

Census migration information can be condensed down to address north-south drift, assessed here as the balance of moves between London and SE & E England on the one hand, and the rest of England and Wales on the other – see Table 8.7.

As well as providing the 'raw' gross and net migration flows, these are combined as a measure of migration effectiveness so as to minimise the scale effect, given the somewhat different size of the white British category compared with the others. In the case of the Jewish, Sikh, and white British groups, an overall negative north-south drift (ie, a south-north drift) is replaced by a positive north-south drift when students are excluded. For the Arab group, the change through excluding students is in the same direction, increasing the small positive north-south drift already found with students included. However, for the Chinese group (where student moves make up almost half of all within England & Wales moves, compared to well below 20% for each of the other groups), the change is in the opposite direction. The penultimate line of the table indicates that 2010-11 north-south drift has a negligible impact on the overall group population (in the rest of England and Wales) for the white British, Chinese, and Sikh groups. For the Jewish group it has eroded that super-region's population by over 0.5%, and by as much as 0.75% for the Arab group – levels of annual change that would lead to a material re-balancing of the population geography of these groups if maintained into the future.

Table 8.7 North-south drift 2010-11

		2010-11 migrants				
	All usual residents	Arab	Chinese	Jewish	Sikh	White British
From Rest of E & W to London, SE, E	208400	1770	4310	1200	1660	154400
From London, SE, E to Rest of E & W	233500	1600	4040	1710	1780	176400
Net north to south drift	-25100	170	270	-510	-120	-22000
Drift effectiveness	-0.06	0.05	0.03	-0.18	-0.03	-0.07
Net drift (excluding students)	7500	710	20	350	120	1300
Drift effectiveness exc students	0.02	0.36	0.01	0.21	0.05	0.01
Impact on rest of E&W population	-0.02%	-0.75%	-0.01%	-0.56%	-0.05%	0.00%
2011 Population in 'rest of E&W'	33420200	94850	182330	62150	223880	29120200

Source: Author calculations based on 2011 SMS tables; student figures extrapolated from 2011 microdata

Concentration or dispersal

Finally, we can encapsulate the impact of these various trends by considering whether groups are becoming more concentrated or more dispersed (due to migration). This was achieved through an assessment that divides the local authorities of England and Wales into five parts, independently for each group. The authorities were ranked, based on the proportion of their total population that the group represents (group density), and the list split into quintiles, each accommodating approximately 20% of the group population (see Simpson and Finney, 2009).

The net migration between the quintiles is summarised in Table 8.8. Clearly, the white British population is rather larger than the other groups, and gives rise to larger inter-quintile net migrations; group population percentage change figures are also shown in the table to allow for this.

Table 8.8 Inter-quintile movements 2010-11

	Net migration increase 2010-2011									
	Arab		Chinese		Jewish		Sikh		White British	
densest population quintile	300	0.6%	700	0.9%	230	0.4%	-440	-0.5%	-60	0.0%
second population quintile	300	0.7%	980	1.2%	-370	-0.7%	-640	-0.8%	-1170	0.0%
middle population quintile	190	0.4%	590	0.8%	-480	-0.9%	-20	0.0%	250	0.0%
fourth population quintile	10	0.0%	-500	-0.6%	10	0.0%	80	0.1%	18180	0.2%
sparsest population quintile	-800	-1.7%	-1780	-2.3%	600	1.1%	1010	1.2%	-17200	-0.2%

Source: Author calculations based on 2011 SMS tables and standard census outputs

There is a clear pattern of concentration (perhaps re-concentration following earlier dispersal) for Arab and Chinese groups; a clear pattern of dispersal for Sikhs; and a mixed message for the Jewish group - generally dispersal except for the most concentrated quintile (a move away from the 'middle ground'). The large volumes for the white British disguise the overall minimal impact in percentage terms.

It is worth noting that as the small groups (including larger minorities not considered here) have a very urban focus, the quintile pattern for the white British group is geographically reversed compared with the other groups. For the small groups, the densest quintile consists primarily of London authorities, whereas all bar one of the London Boroughs are in the least dense quintile[21] for white British residents.

Counter-urbanisation would thus manifest itself for the small cultural groups as movement away from the *most* dense quintile, and for the white British as movement away from the *least* dense quintile.

8.5 Discussion and conclusions relating to 2010-11 migration

It has long been recognised that the level of migration falls off with increasing distance between origin and destination (Ravenstein, 1885), and tools to quantify the migration / distance relationship have been available for a considerable period (Wilson, 1967; Fotheringham and O'Kelly, 1989). Nevertheless, there are few studies that have focused on quantifying the deterrence effect; see, for example: Makower, Marschak, and Robinson (1938), Schwartz (1973), and Yang, et al (2015) in a British, American, and Chinese context, respectively. Stillwell et al (2016) suggest that this is because of the absence of suitable datasets that provide origin and destination location with sufficient accuracy (see also Niedomysl, Ernstson, & Fransson, 2015). Stillwell and colleagues' major study compares the frictional impact of distance on internal migration patterns across a large number of countries. They found fairly consistent frictional values across Western Europe, with lower values in North America. However, all these aforementioned studies have considered the population as a whole.

The research reported in the current paper appears to be the first to investigate how the geographical separation between cultural group communities influences the propensity to move between them. The purpose of including as wide a range of characteristics as possible in the modelling process was to allow the other influences on the likelihood of making a particular move to be incorporated, so that the impact

[21] That is, the authorities in which the white British form the lowest proportion of the total population, rather than their density measured in persons per unit area.

of distance could be established having controlled for other factors. Given the high proportion of variability that the models explain, this aim has been achieved, and significant weight can be attached to the distance coefficients that have been determined. The analysis has shown (in response to question 1) that there is indeed a difference between groups in the impact that increasing separation has on the choice of destination. Of the groups examined, Jews are most averse to choosing the longer of alternative inter-community moves, but all of those groups are more affected by distance than the white British dominant group.

It is not completely clear why this should be the case. However, it is likely that the basic configuration of community locations will have some influence – for example, the dominance of the London area as home to British Jewry means that the distances between some of the largest communities are smaller than equivalent distances for other groups. Furthermore, the benefits of group congregation (Peach, 1996b), which have contributed to the pattern of communities, may act as a disincentive to consider more distant/less well known alternative destinations. In addition it is worth noting that the drivers behind inter-community moves (as indicated by the variables and regression coefficients shown in Table 8.2) differ by group, with the white British group (for whom distance has a reduced impact) strongly featuring the 25-59 age range and people living in rented accommodation. With the exception of 25-59 year old Chinese, these elements do not feature strongly for the other groups, with age under 25 (but not specifically students) being more important to Chinese, Jewish, and Sikh groups, together with an absence of dependent children being a feature of Arab inter-community moves. Inter-community movers for the majority group would thus exhibit a different balance of life-course stages and underlying purposes of move than the smaller groups; this might contribute to differences in the impact of inter-community distance.

The other area that has been examined in detail, this time through multinomial logistic regression, is the identification of characteristics that influence the choice of super-region of move destination, given the super-region of move origin. That analysis confirms the important influence of age, qualifications, home tenure and, in particular, student status, in determining the destination for those who move. In respect of research question 2, the impact of characteristics does vary from group to group; however, some conclusions apply to many groups. For example,

students based in London and the SE & E of England are far more likely to move to places in the rest of England and Wales than non-students. The south-east regional escalator (Fielding, 1992) is still present – with graduates in the north and west of England and Wales far more likely to move to London and the south-east than those with lesser qualifications. The difference in behaviour of those aged 60 and over lends some support to the 'stepping off the escalator'/return migration hypothesis (Champion, 2012), given the increased probability, for white Britons, of moving to outside of the south and east from within that corner of England and Wales, compared with younger age groups.

In examining north-south drift, the influence of students is very clear. If students are excluded, each group (including the white British) shows a positive net north-south drift. However, for all groups except Arabs and Jews, the impact on the population north or south of the dividing line is negligible. Although the actual net figure for Arabs and Jews is below 1000 persons for each group, it represents between 0.5% and 0.75% of that group's population north of the line; this would result in a material change if the 2010-11 rate is representative of the longer term level. The conclusion, therefore, is that north-south drift is, for the population at large, currently no longer a matter of any practical concern, though for small groups, relatively limited net drift could still have a measurable long term population impact.

Examination of movement between group quintiles of population density indicates that the Chinese group is moving away from its sparsest quintile towards the densest population quintile. This result for 2010-11 repeats that for 2000-01 reported by Simpson and Finney (2009) who found that the Chinese group's behaviour was an exception to the other ethnic groups observed. The current study shows that this exceptional behaviour also applies to the Arab group. In contrast, the Sikh group (and Jewish group, except for the most densely populated quintile) is, in 2010-11, following the dispersing pattern demonstrated by most ethnic groups in 2000-01.

These patterns are reflected in the counter-urbanisation analysis presented by considering movement between rings around London – where material proportions of the England and Wales population for each of this study's minority groups are found. All groups have a net outflow from Inner London, but the Arab and Chinese groups' move away from quintile of sparsest presence is reflected in their net loss

from the outer rings up to 90km from central London. This may indicate disillusionment with semi-rural living leading to a re-grouping in urban areas. Based on the analysis for the London area, the white British group is continuing to demonstrate a strong counter-urbanisation pattern. Jews and Sikhs have developed some of the desire for semi-rural living which Champion (2001) noted for the population as a whole. This is reflected in these two groups demonstrating notably higher levels of regional migration effectiveness than Arabs and Chinese. In response to the third research question, the conclusion is that Jews and Sikhs more closely follow the trends found in the population as a whole and in previously studied ethnic groups, with the Chinese group frequently bucking the trend. The high proportion of overseas-born / recently-arrived individuals in the Arab and Chinese groups, and the very high proportion of students in the Chinese group, may explain the extent of difference in movement patterns between those groups and the white British.

Overall, this research has provided detailed assessments of the diverse patterns of 2010-11 internal migration in England and Wales for three groups not previously examined, and has, through the use of 2011 census data, provided an update on white British (and Chinese) behaviours found in other studies. It also paves the way for equivalent analysis to be carried out on other minority groups, and provides a modelling methodology that could be applied elsewhere.

The findings in relation to the differences in resistance to making longer distance moves, and the greater likelihood of making out-of-super-region moves for graduates (and the influence of age and home tenure on these patterns for some of the groups) raise issues about the future socio-economic and demographic mix of small cultural group populations in the various communities where they live. The changing mix over time will give rise to significant policy issues for communal organisations with an interest in social welfare of these groups, and the wider communities in which they reside.

8.6 Extending the analysis to the longer term

Thus far, the text has examined patterns of internal migration in England and Wales in the 2010-11 period (or, more precisely, a change of address occurring between 27 March 2010 and 27 March 2011, the date of the census), making use of the 2011 Special Migration Statistics files (SMS) and the 2011 safeguarded

individual microdata. The level of migration and potentially also its pattern will have been influenced by the economic situation during that period (Fielding, 2012), so there would be merit in comparing these patterns with internal migration over a longer period.

The ONS Longitudinal Study (LS) provides the potential to achieve this. The LS consists of a series of linked records extracted from the 1971, 1981, 1991, 2001, and 2011 census returns for individuals born on four particular days of the year (ONS, 2016). It also contains health related information extracted from National Health Service records, though those elements are not relevant to this research. The particular sub-populations under examination, Arabs, Chinese, Jews and Sikhs, are quite small, and as the LS represents just a 1.1% sample of the population there are limits to the level of, for example, geographic or age subdivision that can be achieved whilst working within the ONS rules intended to avoid the identification of individuals in the dataset. The sample size available is shown in Table 8.9 (and a more detailed breakdown by age and by regional presence is provided in Tables C.12 and C.13 in Appendix C). The Sikh sample represents noticeably more than 1.1% of the overall Sikh population. ONS has reported consistently high sample proportions for Sikh and Asian-born groups at each census covered by the LS (ONS, 1995, 2015c), ascribed by ONS to date-of-birth preferences. It should also be noted that individuals need be identified as a member of the relevant cultural group only once to be included in the study sample of LS members for the research reported here[22]. Thus the study sample includes as Jewish, for example, any LS member recorded as Jewish in 2001 even if recorded as, say, 'religion not stated' in 2011 (and vice versa), hence the number of individuals identified in the first numerical column of Table 8.9 exceeds the individual numbers tabulated to the right (see Simpson, Jivraj, and Warren, 2014, for a detailed examination of ethnic group and religion consistency between censuses).

[22] In order to avoid confusion between the sample of the population included in the LS, and the sample of LS members included in the dataset for this study, 'study sample' refers to the subset of LS members selected for this research.

Table 8.9 LS members of groups and presence at censuses

	Identified Individual LS members	Present in 1971	1981	1991	2001	2011	At Consecutive Censuses 1971 & 81	1981 & 91	1991 & 01	2001 & 11	at all 5 censuses
Arab	2121	31	111	265	592	2121	27	95	212	592	22
Chinese	5804	361	1063	2045	2558	4418	312	963	1325	1730	176
Jewish	3774	1656	1990	2375	2943	3082	1521	1839	2244	2251	1032
Sikh	7394	1386	2799	3748	4943	6558	1235	2464	3319	4107	821

Note: Arabs can only be identified in 2011; Chinese in 1991, 2001, and 2011; Jews and Sikhs in 2001 and 2011.
Source: ONS LS output

8.7 LS data suitability

Two potential weaknesses in the data need to be examined, to ensure data suitability for the intended use. Although individuals born on four specific dates are included in the LS back to 1971, religion was only recorded in the 2001 and 2011 censuses. Thus, for 2001 and 2011, the Jewish and Sikh study samples are 'complete', and persons recorded as Jewish or Sikh in 2001 and/or 2011 can be traced back to 1991, 1981, and 1971 (if born, present in England and Wales, and with a properly completed census return). Jews and Sikhs present in the earlier years, but not present at the 2001 and/or 2011 census will be included in the LS, but cannot be identified by religion (and therefore cannot be added to the study sample). Therefore, early years records in this study sample will be 'missing' older persons, so there is an issue of age bias that must be considered. The Chinese ethnic group was identified in the 1991, 2001, and 2011 censuses so the impact of this issue on that group may be less, but Arabs were only separately identified in 2011, so unless present at the 2011 census, Arabs resident in England and Wales at earlier censuses cannot be so identified.

In order to give a broad indication of the scale of this issue, we can compare the study sample size at various years with estimated values of the overall population of each group. This can provide no more than a general indication as there is no mechanism by which the accuracy of any population estimate can be assessed for years before the ethnic group or religion census question was asked, and sample fractions in the LS vary by year. Table 8.10 indicates the approximate proportion of the population represented in the study sample. The values shown in the table are based on population estimates derived from: published ethnic group and religion

Table 8.10 Approximate proportion of population represented in the LS

Group	Percentage of Population Represented (by LS)				
	1971	1981	1991	2001	2011
Arab	10%	25%	40%	55%	-
Chinese	50%	>80%	-	-	-
Jewish	40%	55%	75%	-	-
Sikh	>90%	>90%	>90%	-	-

Note: - indicates full coverage

Source: Author calculation based on ONS LS output and other research

census populations; place of birth information from earlier censuses; estimates for some groups available from the Labour Force Survey; and research by others[23] [24].

In addition to the 'censoring' of data described above, a more subtle source of bias needs to be considered. The LS does not suffer from the main source of attrition faced by panel/longitudinal surveys – participant fatigue leading to 'opting out' of later rounds – as the LS participants do not know that they are included. There is attrition due to deaths and international emigration (and also an expansion of the dataset due to births and immigration). However, there are also gains and losses due to 'unknown' reasons. It is important to consider whether the migratory behaviour or other characteristics of these censored/missing individuals differs sufficiently from traced individuals that a material level of bias exists.

A flavour of this can be identified through examination of the information that exists for 2001 and 2011 using, as an example, the Jewish members of the LS. Table 8.11 provides a breakdown of persons 'lost' and 'gained' between 2001 and 2011. Note that emigration and immigration are only traceable where individuals de-register or register with an NHS general medical practitioner, which the majority of emigrants fail to do; note also that a small proportion of the births and immigrations recorded actually pre-date the 2001 census, but the individuals were not found in the 2001 census. Table 8.12 considers the losses in more detail and provides information about the characteristics of persons known to have not moved between 2001 and

[23] Sources of underlying data - England and Wales Census 1971, 1981, 1991, 2001, and 2011; Labour Force Survey LFS No3 1981, LFS No4 1984, LFS No 9 1991; Rees and Butt, 2004; Schmool and Cohen, 1998; Peach and Gale, 2003.

[24] It is worth noting that, even allowing for over-sampling of Sikhs in the LS, it is likely from this work that earlier estimates (Peach and Gale, 2003) may well have understated the numbers of Sikhs resident in England and Wales in 1971 and 1981 by as much as 30%.

Table 8.11 Jewish LS member appearances and disappearances 2001-2011

Recorded in 2001	Still present in 2011	'Lost' between 2001 and 2011				'Gained' between 2001 and 2011				Recorded in 2011
		Total	deaths	emigration	**unexplained**	Total	births	immigration	**unexplained**	
2943	2251	692	292	36	**364**	831	377	209	**245**	3082

Note: emigrations are actually NHS de-registrations; immigrations are (non-birth based) NHS registrations
Source: Author calculation based on ONS LS output

Table 8.12 Characteristics of LS Jewish members present in 2001

Recorded at same address in 2001 and 2011 (Non-movers)

decade of birth	TOTAL		home owners		degree holders		with dep children		in work	
1910s 20s	158	13%	134	85%	13	8%	*		16	10%
1930s	163	14%	143	88%	34	21%	*		70	43%
1940s	245	21%	233	95%	75	31%	55	22%	184	75%
1950s	205	17%	184	90%	86	42%	126	61%	167	81%
1960s	136	12%	122	90%	51	38%	104	76%	101	74%
1970s	45	4%	28	62%	15	33%	*		27	60%
1980s	87	7%	82	94%	0		85	98%	0	
1990s	143	12%	126	88%	0		140	98%	0	
Total	1182	100%	1,052	89%	274	23%	528	45%	565	48%

Recorded at different addresses in 2001 and 2011 (Movers)

decade of birth	TOTAL		home owners		degree holders		with dep children		in work	
1910s 20s	54	5%	43	80%	*	15%	0		*	
1930s	79	7%	61	77%	19	24%	*		37	47%
1940s	110	10%	88	80%	40	36%	*		81	74%
1950s	126	12%	99	79%	48	38%	72	57%	94	75%
1960s	184	17%	139	76%	85	46%	88	48%	147	80%
1970s	211	20%	142	67%	97	46%	25	12%	149	71%
1980s	173	16%	142	82%	*		140	81%	*	
1990s	132	12%	97	73%	0		131	99%	0	
Total	1069	100%	811	76%	302	28%	473	44%	521	49%

Recorded in 2001, 'missing' by 2011 (36 known emigrants and 364 unexplained)

decade of birth	TOTAL		home owners		degree holders		with dep children		in work	
1910s 20s	31	8%	25	81%	0		0		*	
1930s	36	9%	31	86%	*		0		17	47%
1940s	45	11%	38	84%	*		*		35	78%
1950s	45	11%	38	84%	19	42%	30	67%	34	76%
1960s	58	15%	33	57%	33	57%	30	52%	40	69%
1970s	75	19%	36	48%	38	51%	*		39	52%
1980s	60	15%	42	70%	0		40	68%	*	
1990s	50	13%	35	70%	0		46	96%	0	
Total	400	100%	278	70%	115	29%	156	39%	176	44%

Note All characteristics measured in 2001
Cell counts marked * have been suppressed in order to protect confidentiality of individuals within the dataset
Source: ONS LS output

2011; persons who did move between 2001 and 2011; and all other persons who have 'disappeared' between 2001 and 2011 (excluding known deaths). The table focuses on characteristics previously found to be differentiators between movers and non-movers based on 2011 census microdata analysis – being a home owner (rather than renting etc); being a degree holder (rather than having no or lower qualifications); the presence of dependent children in a household (or not); and being in work rather than not (Sapiro, 2016a). Characteristics as recorded in 2001 are shown in the table.

Individuals are grouped by decade of their birth. Overall, the age profile (see the TOTAL column) of the 'missing' group is closer to the mover group than the non-movers, as are the proportion of the missing group who are home-owners or degree holders.

The other categories are less helpful in understanding the nature of the missing group, as the presence of dependent children and the characteristic of being in work could well change over the intercensal period. Thus, a 'snapshot' taken in 2001 may have less consistency over the 10 year period than, for example, home ownership.

The implication of the pattern found is that, in common with panel surveys, home movers are more likely to become untraceable at the next round (or census) than those who do not move; in this case because linkage in the LS relies on NHS transfer of GP registration, which is frequently needed for movers but not non-movers (ONS, 2014c). For the intercensal periods prior to 2001-11, the study sample is incomplete (as discussed above), so the number of individuals who become missing in any of the previous periods is unknown. However the LS does achieve very high tracing levels (ONS, 2014c). Insofar as using records drawn from the LS for analysis of internal migration patterns of small groups is concerned, the proportion of the population who move may be slightly under-estimated. However, the primary focus here is on those who move, and the degree of bias within the moving element should not be material. Indeed, even the absence from the study sample of persons present in 1971 (for example) but who died before 2001 is not a material flaw when, for example, looking at patterns of migration between 1971 and 2011, as such individuals would not fall within scope. Conversely, their absence would need consideration if change in spatial distribution of groups over the longer

term was being investigated using this data source, as those aged over 60 or future (pre-2001) emigrants might have been distributed differently to those found within the study sample in the earliest censuses.

The aim of this section of the chapter is to compare the patterns of internal migration over a longer period than the one-year interval included in the earlier sections. Whilst it might be possible to produce some analysis for the Arab group for the 2001-11 period this would be based on only 307 movers; the sample would be much smaller if any longer term analysis was to be presented, so the Arab group is not considered further. All the other groups do, understandably, have fewer participants available in the earliest years, so rather than focus on, say, 1971-2011 patterns, the sample size has been increased by considering migration changes over what could be considered as a generation, by pooling data to produce a 30 year plus pattern of 1971/81 to 2001/11. This has been achieved by supplementing any individuals linked between 1971 and 2011, with those who can be linked between 1981 and 2011, or 1971 and 2001. The final sample sizes used in the analysis are set out in Table 8.13; the table also includes figures for the white British benchmark group, whose sample size is not an issue.

Table 8.13 LS members sample size for internal migration analysis

	2001-2011		1971/81-2001/11	
Group	Non-movers	Movers	Non-movers	Movers
Chinese	930	800	53	822
Jewish	1182	1069	188	1865
Sikh	2497	1610	236	2541
White British	206,006	171,423	37,964	315,595

Source: ONS LS

8.8 Medium- and long-term migration patterns

Section 8.4 has examined a number of movement patterns found in the 2010-11 migration data. Those patterns are re-examined here in the context of the medium term 2001-11 period and longer term 1971/81 – 2001/11 period. Note that all tables in this section include only LS members – typically a 1.1% sample of the population – rather than whole population figures as shown for 2010-11 in Section 8.4. A summary table of the super-regional migration pattern for the groups over these longer periods is included at the end of Appendix C.

Counter-urbanisation and London rings

The relatively low density of minority groups in the outer rings has meant that to minimise issues with disclosure the outer pairs of rings have been combined in the information shown in Table 8.14. As with the 2010-11 analysis, the table includes only movements within the seven ring area.

The 2010-11 analysis showed a clear counter-urbanisation pattern for the white British group, and a similar pattern occurring for the Jewish and Sikh groups too. Table 8.14 indicates a stronger counter-urbanisation pattern for the white British group (in terms of migration effectiveness) for 2001-11 and an even stronger pattern over the 30-plus years period, with effectiveness values in excess of -0.5 for inner London and +0.5 for circles 6 and 7. This implies that the pattern was strongest before 2001 and, whilst still present, has gradually weakened as the century has progressed. This is in line with the findings of Champion (2005b), Simpson and Finney (2009), and Lomax et al (2014). The same patterns can also be found in the Jewish and Sikh groups. The actual flows are, of course, much smaller than those for the white British group, and fluctuations in the pattern are more apparent. Nevertheless for these groups too, the strongest counter-urbanisation patterns are found in the longer term period, indicating that these two groups have been mimicking the white British pattern for several decades. (Note that an alternative approach to quantifying suburbanisation in Jewish communities across England and Wales, for the 2001 to 2011 period, is set out in Appendix D to this thesis).

Table 8.14 London circles migration flows and effectiveness (longer term)

2001 – 2011	Chinese			Jewish			Sikh			white British		
	To	from	eff	to	from	eff	to	From	eff	To	from	eff
inner London	38	54	-0.17	59	67	-0.06	15	37	-0.41	1454	2343	-0.23
circle 2	53	42	0.12	70	141	-0.34	44	110	-0.43	1776	3740	-0.36
circle 3	21	19	0.05	74	34	0.37	68	36	0.31	1887	1936	-0.01
circles 4 & 5	24	23	0.02	38	10	0.58	72	26	0.47	4102	2965	0.16
circles 6 & 7	26	24	0.04	26	15	0.27	20	11	0.29	3522	1757	0.33
1971/81 - 2001/11												
inner London	37	82	-0.38	107	189	-0.28	11	93	-0.79	1978	7591	-0.59
circle 2	75	51	0.19	173	312	-0.29	108	135	-0.11	4726	9353	-0.33
circle 3	32	12	0.45	168	38	0.63	90	24	0.58	4390	4038	0.04
circles 4 & 5	30	25	0.09	87	31	0.47	80	35	0.39	9394	5868	0.23
circles 6 & 7	22	26	-0.08	48	13	0.57	15	17	-0.06	8757	2395	0.57

Source: Author calculation based on ONS LS output

The Chinese medium and longer term patterns do show some of the same characteristics as found in the 2010-11 pattern – movement away from Inner London, with the largest increases found in circle 2 (outer London) and circle 3 (mainly local authorities abutting Greater London). Changes beyond circle 3 are small, so the pattern of movement back towards Outer London from circles 5 to 7 found in the 2010-11 analysis is a recent development.

Regional migration effectiveness

Table 8.15 summarises the level of movement out of and into each of the standard regions over the medium and longer term, replicating the analysis carried out for 2010-11 in Section 8.4. As for 2010-11, the overall level of regional migration effectiveness for the white British and Chinese groups is lower than found in the Jewish and Sikh groups in 2001-11, though for the longer term position the Sikh group joins the white British and Chinese groups, leaving only the Jewish group with a higher migration effectiveness.

Table 8.15 Regional migration effectiveness (longer term)

	Chinese			Jewish			Sikh			white British		
2001 – 11	To	From	Eff	To	From	Eff	To	From	Eff	To	From	Eff
North West	16	28	-0.27	17	21	-0.11	13	12	0.04	2851	2898	-0.01
North East	23	22	0.00	23	23	0.00	30	27	0.05	1213	1084	0.06
Yorks & Humber										2894	2767	0.02
East Midlands	24	19	0.12	27	18	0.20	31	33	-0.03	3604	3108	0.07
West Midlands	17	25	-0.19				68	73	-0.04	2539	3185	-0.11
East of England	40	42	-0.02	95	47	0.34	54	33	0.24	5003	4602	0.04
Inner London	73	63	0.07	82	76	0.04	24	44	-0.29	2956	3422	-0.07
Outer London	64	63	0.01	92	169	-0.30	80	139	-0.27	2751	5985	-0.37
South East	57	43	0.14	46	27	0.26	104	49	0.36	7403	6904	0.03
South West	25	34	-0.15	20	21	0.00	17	11	0.21	5483	3368	0.24
Wales										2028	1402	0.18
Group Population weighted												
Mean (absolute)			0.10			0.22			0.15			0.09
Standard deviation			0.08			0.35			0.22			0.08
1971/81 - 2001/11												
North West	18	42	-0.40	39	48	-0.10	11	12	-0.04	5474	8507	-0.22
North East	22	42	-0.32	24	45	-0.30	19	10	0.31	1811	3365	-0.30
Yorks & Humber							25	38	-0.21	5460	5994	-0.05
East Midlands	24	20	0.09	16	14	0.07	82	62	0.14	8222	5585	0.19
West Midlands	16	26	-0.24	13	22	-0.26	106	179	-0.26	5271	7439	-0.17
East of England	53	34	0.22	242	55	0.63	75	44	0.26	13813	9209	0.20
Inner London	82	91	-0.05	135	227	-0.25	20	102	-0.67	3864	10736	-0.47
Outer London	110	71	0.22	222	366	-0.24	191	162	0.08	7153	16573	-0.40
South East	60	50	0.09	91	34	0.46	128	62	0.35	19308	12710	0.21
South West	24	33	-0.16	50	21	0.44	28	10	0.47	13976	5502	0.44
Wales										4488	3103	0.18
Group Population weighted												
Mean (absolute)			0.19			0.31			0.22			0.23
Standard deviation			0.14			0.37			0.25			0.13

Source: Author calculation based on ONS LS output

More importantly, the actual effectiveness level for all groups are highest for the longer term period, and progressively reduce through the medium term period and are lowest for 2010-11. Whilst this does not necessarily imply a reducing level of internal migration over time (see Champion and Shuttleworth, 2015a, 2015b), it does mean that (at least for the groups under investigation here) internal migration has progressively had a reducing impact overtime in the redistribution of groups at a regional level. Moreover, the patterns are not clear cut; for each group only six or seven of the 11 regions show a consistent net direction of migration over the three periods.

North-south drift

North to south migration drift has been investigated in Section 8.4; this found that, for 2010-11, the concept had a negligible impact on overall group population for white British, Chinese and Sikh groups. For the Jewish group, a measurable south to north drift became a slightly larger north to south drift if student moves were excluded. It is not practical to separately account for student moves when looking at a 10 or 30+ years period (as many individuals will have a student status at some intermediate point in the period, whereas only status at the start or finish point may be known), and such impacts should be diluted in a longer-period assessment. Table 8.16 shows the results of the analysis for the longer time periods.

Table 8.16 North-south drift (longer term)

2001 – 2011	Chinese	Jewish	Sikh	white British
From Rest of E & W to London, SE, E	69	54	79	6287
From London, SE, E to Rest of E & W	46	58	82	9089
Net north to south drift	23	-4	-3	-2802
Drift effectiveness	0.20	-0.04	-0.02	-0.18
Impact on rest of E&W population	-3.5%	+0.7%	+0.1%	+1.1%
2011 Population in 'rest of E&W'	659	552	2,283	244,158
1971/81 - 2001/11				
From Rest of E & W to London, SE, E	100	103	164	14804
From London, SE, E to Rest of E & W	41	95	122	19947
Net north to south drift	59	8	42	-5143
Drift effectiveness	0.42	0.04	0.15	-0.15
Impact on rest of E&W population	-18.5%	-1.6%	-2.8%	+2.2%
2001/11 Population in 'rest of E&W'	319	488	1,495	229,257

Source: Author calculation based on ONS LS output

Leaving aside the issue of quite where the north-south dividing line should be drawn, previous researchers have found different trends at different times. Champion and Townsend (1990) reported a north to south population drift in the 1970s, with Stillwell, Rees, and Boden (1992) indicating a reversal of the main direction of flow by the late 1980s. More recently, Lomax et al (2014) showed that the net direction was to the north from 2001 to 2007, with a small north to south balance for the rest of that decade. It is thus difficult to predict what might be found from the medium and longer terms assessment presented here.

What Table 8.16 does show is that for the white British group, the overall trend for the 2001-2011 and indeed the 1971/81- 2001/11 periods has been a south to north net movement, sufficient to increase the population of the north by more than 1% over the medium term period, and by over 2% in the longer term. Conversely, the pattern for the Chinese group shows the opposite picture, with a 3% loss in population in the north between 2001 and 2011, and an 18% loss of population since 1971/81 due to a strong north to south drift.

For the Jewish group the movements have, overall, been close to being in balance over the medium and longer term, though the Sikh group's almost 3% loss in population in the north over the 30+ year period must have been concentrated in the earlier decades, as the 2001-2011 period is in equilibrium.

It is important not to conflate a positive south to north migration pattern for the dominant group with an overall increase in northern population and a reducing southern population. Internal migration is not the only mechanism in play; international migration and the balance of births and deaths also have a strong bearing on overall population change.

Concentration or dispersal

Section 8.4 describes how the local authorities were split into five parts (separately for each cultural group) based on ranking the authorities by the density of group population. Table 8.17 shows the migratory flows to and from each of these quintiles for movements occurring between 2001 and 2011 and between 1971/81 and 2001/11. Note that the allocation of authorities to quintiles is constant and is based on 2011 population and population density.

The 2010-11 analysis indicated that although the actual numbers of movements are, as would be expected, much higher for the dominant white British

group than for the small groups, the overall impact on the distribution of population between the quintiles was negligible. However, when measured over the medium and long term that is no longer the situation. For both those periods there is a very clear pattern of white British migration towards the three densest quintiles and away from the two least dense quintiles. Indeed, over the 1971/81 to 2001/11 period the sparsest quintile (defined in terms of the proportion of the population belonging to the white British group - that is, most of the London area plus other conurbation centres) has lost over one quarter of its share of the white British population.

Both the Jewish and Sikh groups have shown the largest increase in their sparsest quintiles over both the medium and long term, as they also did for the 2010-11 period, though there is variation between the groups and time periods as to which of the other quintiles have been the major losers due to internal migration. Though the pattern for these two groups superficially looks the reverse of the white British group, in reality, all three groups are illustrating net movement towards rural areas and away from the urban centres.

Table 8.17 Inter-quintile movements (longer term)

Quintile	Chinese			Jewish			Sikh			white British		
2001 - 2011	To	From	Change	To	From	Change	To	From	Change	To	From	Change
densest	78	69	+3%	70	85	-3%	126	124	+0%	11494	8597	+4%
second	75	77	-1%	97	81	+5%	110	154	-5%	12295	10075	+3%
middle	97	87	+3%	81	117	-8%	95	141	-6%	13095	11861	+2%
fourth	80	88	-2%	125	114	+2%	157	128	+4%	12481	13128	-1%
sparsest	72	81	-2%	94	70	+5%	173	114	+8%	10120	15824	-7%
1971/81-2001/11												
densest	73	71	+2%	174	177	-1%	185	220	-6%	27036	17040	+16%
second	82	89	-4%	182	161	+8%	212	203	+2%	28702	18845	+16%
middle	116	83	+20%	211	226	-4%	134	258	-20%	30654	21134	+16%
fourth	101	89	+6%	231	290	-10%	214	217	-0%	23971	28267	-6%
sparsest	96	136	-16%	201	145	+14%	269	116	+37%	16208	41285	-27%

Note - population quintiles based on splitting local authorities ranked by group population density, using 2011 data

Source: Author calculation based on ONS LS output

The Chinese group is again at variance with the other groups. Its longer term pattern is a mirror image of the Sikh pattern, with a material moving away from its area of sparsest density and an increase in the middle ground. Indeed, the longer term changes are noticeably greater than the 2010-11 and 2001-11 changes, implying that most of the change relates to the earlier decades. It is, of course, important to note that as so much of the Chinese community is made up of students and others who have arrived in the UK in the last decade, the element constituted by those

present in England and Wales since 1971/81 is relatively small. For that group, long-term internal migration is thus only a minor contributor to changes in spatial distribution over time.

8.9 Discussion of medium- and long-term analysis and conclusions

The ONS LS provides the potential for extending the examination of internal migration of small groups to consider medium and long term periods prior to 2010-2011. There is an issue, as with all panel surveys, of sample attrition due to unknown causes. Examination of the data suggests that individuals whose loss from the LS is unexplained are more likely to be movers than non-movers. However, as our focus is solely on the patterns for those found to have moved, this issue will not have any material impact.

The LS represents only typically a 1.1% sample of the population, and we are considering only small population sub-groups, therefore it would be unrealistic to consider whether the overall level of internal migration for these groups has increased or reduced over the period under investigation using this data source. It is, however, possible to assess the general patterns of movement which have taken place, and compare them with those found through examination of 2010-11 internal migration from the main census outputs.

The analysis confirms the long term counter-urbanisation pattern for the white British found in other studies, and its generally reducing intensity over time. However, it also shows that both Jews and Sikhs have been exhibiting similar patterns to the white British group over the longer-term period. For the Chinese group the pattern of movement out from Inner London has been present for a generation, though the retrenchment back from the most outer of areas found in the 2010-11 data is a new phenomenon. Clearly, patterns arising from those present in England and Wales in 1971 and 1981 represent the movement of long term residents and not students; the significant presence of students in the Chinese population in recent times will, however, have influenced the more recent periods.

The pattern of higher levels of migration effectiveness that Stillwell and Hussain (2008) found for many ethnic minority groups at the start of the twenty-first century, and which was found as regards 2010-11 migration patterns for some of the groups under investigation here, is also found in the longer term assessments. This is particularly true for the Jewish group. However, migration effectiveness for all

the groups investigated here has reduced with the passage of time, implying that internal migration was a more important contributor to change in spatial distribution in earlier decades than it is now.

Given that the overall net direction of north-south drift for the population as a whole appears to have varied at different times over the last forty years, it is not surprising that no particularly clear picture emerges for the small groups. There may also be some variation in the overall picture depending precisely where the north-south dividing line is drawn. For this study, the 'south' includes only London, and the SE England and East of England regions - largely because the minority groups have a strong London focus that is spreading over the Greater London boundary into SE and East England, with a clear 'gap' between those communities and those in various parts of the Midlands. Others, for example Lomax et al (2014), in the context of looking at the population as a whole, have included the East Midlands (and SW England) in their definition of 'south'.

Overall, the direction of north-south drift will be a consequence of the relative impacts at different times of the economic draw of the capital and its environs, relative growth in size of academic institutions each side of the line, and house price fluctuations and impact of counter-urbanisation. What is therefore surprising is that the Chinese pattern is consistently in the north to south direction for all three periods examined with a particularly high level of net loss of population north of the line over the long term.

When these various patterns are combined and assessed in terms of impact on the local authorities that fall into the various quintiles of density, some of the largest percentage changes in population are found in the white British group, particularly over the longer term. Indeed, although the Jewish and Sikh groups are consistent in showing a movement towards their sparsest quintile in all periods and the Chinese away from the sparsest quintile, only the white British group demonstrates a consistent sliding scale of change from sparsest to densest quintile.

The overall conclusion of this analysis of the ONS LS data is that the 2010-11 patterns, obtained from a 100% sample, are broadly supported as being in-line with the longer term trends through an analysis of a small random sample of the population and migration events observed over a 40 year period, but with evidence of some of the observed phenomena weakening in effect over time.

9. Back to the future: applying a current geodemographic classification to historic data to produce trend-based population projections

The previous chapters have examined a number of aspects of the population geography of the Jewish population of England and Wales, based on various assessments that made use of 2001 and 2011 census outputs. In particular, the analyses presented in those chapters have sought to address the principal aims and research areas of the thesis. Referring back to the research bullet points set out early in Chapter 1, the spatial distribution of Anglo-Jewry has been investigated; geographic heterogeneity of the group has been determined; and changes in spatial distribution and patterns of internal migration over time have been addressed. Importantly, the extent to which there is similarity or difference in the patterns for Jews compared with other small cultural groups has been analysed in some detail.

This chapter builds on the findings of the assessments presented in Chapters 5 to 8, and making use of some of the techniques developed for investigating those matters, looks to the future. Having acknowledged that the various communities and areas of Anglo-Jewry have markedly different characteristics and age profiles, the analysis presented here develops a novel methodology for establishing demographic trends by geodemographic class, and uses that information to produce a population projection for Anglo-Jewry, looking forward to 2031. As described in the Abstract below and in the ensuing text, robust assumptions regarding future fertility and mortality are devised, and used in combination with migratory patterns, to determine the future population by geodemographic class and ultimately for the group as a whole. The primary focus of this chapter, therefore, is to address the final thesis aim – to consider what the patterns derived in the earlier work might mean for the future.

The text of this chapter reproduces a paper titled 'Back to the Future: Applying a current geodemographic classification to historic data to produce trend-based population projections' DOI 10.1007/s12061-016-9209-z, which was submitted to the journal of Applied Spatial Analysis and Policy in March 2016, accepted on 7 September 2016, and published on line on 24 September 2016. Some analysis relating to determining trends for individual localities, omitted from the published paper for reasons of space, has been included in the chapter, as section 9.7. In addition, the commentary on inter-marriage and transmission of religion in the discussion section has been updated to take advantage of a recent data release.

Abstract

A novel approach is described to developing population projections for minority groups for whom information used in traditional approaches is not directly available. Geodemographic assessment is a powerful tool for simplifying and interpreting complex patterns; but fixed classifications have rarely been used to compare and contrast population characteristics found in consecutive decennial censuses and establish trends for the future. This paper describes an innovative projection methodology, using an existing geodemographic classification and standard census outputs, that addresses and overcomes three challenges: the application of a geodemographic classification to a minority group – the Jewish residents of England and Wales – across multiple points in time; analysis of changes in that population between the 2001 and 2011 censuses, by geodemographic class; and the development of a projection based on these recent observed trends. The approach adopted specifically allows for temporal changes in the influence of population characteristics. The balance between the impact of births, deaths and migration on area / class population over time is determined and, after consideration of future fertility and mortality levels, used to develop class-by-class population projections for Anglo-Jewry and an overall projection for 2021 and 2031. The analysis indicates that there will be material differences between the demographic futures of the areas in which the various classes are found, and predicts a reversal in the numerical decline of the Jewish population that has prevailed over the last half century. As a result, the projections raise significant policy implications; additionally, the approach could be applied to other groups and other places.

9.1 Introduction

The research described in this paper grew from a need to examine recent population trends and produce an analytically-based population projection for a small sub-population – Anglo Jewry. The absence of age-specific fertility measures, or mortality analysis based on accurate life-tables for this group, precluded the use of traditional approaches (Newell, 1988; Rees et al, 2012). For religion-based groups, the lack of the type of medium term supplementary data that could be linked with ethnic group fertility and mortality, as used by Rees et al, together with a desire to take account of heterogeneity within the group, meant that Rees's methodology

could not be applied to this problem. Instead, an innovative alternative methodology using geodemographic classification has been developed to examine recent socio-economic and demographic trends, and allow a population projection for Anglo-Jewry to be developed. Whilst the focus of the paper is the Jewish population of England and Wales in the early twenty-first century, the approach described would be equally applicable to any population group for whom group-focused fertility, mortality, or migration data cannot be directly ascertained with sufficient accuracy.

Geodemographic assessment is used to distil information from a wide range of characteristics of a population to produce a readily-understood spatially-related summary. As Vickers (2010, p37) puts it, 'The purpose of this analysis is not to produce a perfect representation of the world, but to simplify a complex pattern enough to make it easy to interpret and understand.' Such assessments have been carried out for both academic research purposes and to target private sector marketing campaigns over the last 30 years (Batey and Brown, 1995; Singleton and Spielman, 2014). Despite extensive analyses being carried out following the release of each census, there has been no substantive attempt to quantify change between censuses using geodemographic assessments – Vickers' report on an 'experimental' (2010, p39) exercise appears to be the sole example. Not only would such analyses provide a synoptic view of changes that have occurred, based on a wide range of underlying characteristics of the population, but changes quantified in this way might be used to establish trends. These could then be applied to classes within the later geodemographic assessment, in order to provide projections of population change overall, and expected changes in characteristics of groups at a local level. Such an approach would provide a way of gaining a deeper insight into current and future trends for minority/locality sub-populations.

In order to demonstrate the successful addressing of these challenges, this paper makes use of an existing geodemographic assessment based on 2011 census data characteristics of Jewish residents of England and Wales (Sapiro, 2016b – *incorporated in Chapter 5 of this thesis*). That paper describes how the challenges of carrying out a geodemographic assessment of a small unevenly distributed sub-population were overcome, whilst avoiding issues of the impact of outlier values and non-optimum local-minimum solutions. The key elements of the approach and results achieved are included in this new paper, insofar as they are essential to

understand the current research. In the current paper, that classification is applied to information taken from the 2001 census; that is, a retrospective application of a current classification system to an older census[25]. Forward projections for that population to 2021 and 2031 are then developed.

Vickers (2010) describes the application of a 2001 England and Wales Output Area classification system to 1991 data. Although Vickers used the same methodology as he had devised for the 2001 assessment (Vickers and Rees, 2007), the absence of certain variables from the 1991 census outputs meant that, in practice, a fresh 2001 assessment was carried out (using a much-reduced number of variables) resulting in a new classification system. This system was then applied to the 1991 data (which had to be re-zoned to the 2001 output area geography), using the same cluster centres as had been produced by the 2001 assessment. The assessment described in the current paper does *not* re-work the later (2011) census analysis, but applies it directly to 2001 census data. Additionally, the classification technique applied in this work, as detailed in Sapiro (2016b), provides more stable and optimal results through complete avoidance of the distorting impact of outlier results, and the potential local minimum/sub-optimal results to which the *k*-means clustering algorithm used alone is prone (Everitt et al, 2011).

Of much greater significance is that the current research considers the potential for temporal societal changes between the censuses in comparing the results of the classification process, and it takes the trends established through this comparison as a basis for developing a future population projection. Although the approach is demonstrated using a small, unevenly distributed, minority population (Jews in England and Wales), it could be applied more widely to other population sub-groups, or a population at large.

This paper therefore has two foci – the development of a methodology to examine recent trends and produce population projections; and the presentation and

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[25] Piekut et al (2012) demonstrate another method of applying a common classification system to two scenarios; however their method (which pools data from both scenarios) is best suited to scenarios which cover separate study areas, with a small number of poolable variables, and similar timeframes, which is not the case for the current study. Most importantly, addressing the issue of temporal change in the impact of a particular level of a characteristic (as described in Section 9.3) would have not been possible had the data from the two censuses been pooled.

interpretation of the application of this approach to Anglo-Jewry. Sections of this paper address the following challenges:

1. Can issues of inter-census geographic zone compatibility, changes in definition of characteristics, and modifications in output availability be overcome?
2. Does a comparison of the earlier and later categorisation of areas produce a meaningful assessment, or are there temporal issues that undermine it?
3. Can the trend-by-class analysis produced be applied to the newer census to make future projections?

9.2 Challenges in applying the 2011 approach to 2001 census data

The main data challenges focus on sometimes subtle changes between characteristics measured at the two censuses; and availability of data for a consistent zoning system.

Consistency of definition of variables between 2001 and 2011

ONS has provided information as to whether output from the 2011 census is 'fully comparable' or 'broadly comparable' with the equivalent 2001 data (ONS, 2012e). All outputs used to define the variables used in the 2011 geodemographic assessment (which are all listed in Table 9.1, and all of which relate solely to the Jewish residents of the analysis areas) are 'fully comparable' with those produced in 2001, except for: 'Marital and civil partnership status' and 'Industry'.

The addition, in 2011, of same sex civil partnerships to the 2001 'married' category has minimal impact (see Table 9.1). However, changes in SIC (standard industrial classification) used for Industry of employment between the censuses create some inconsistencies. Insofar as categories relevant to this assessment are concerned, only 'Professional, scientific and technical activities' (referred to as Group M in the 2011 census output, and largely a sub-section of 2001 Group K) was materially affected (Prosser, 2009). It did not prove possible to 'extract' sub-elements of 2001 Group K in order to produce the same variable for the 2001 assessment; instead (for each analysis area individually) a 2011 Group M to Groups

Table 9.1 Range of values of characteristics of analysis groups in 2001 and 2011

Characteristic of the Jewish population	2001 values			2011 values		
	lower quartile	median	upper quartile	lower quartile	median	upper quartile
Proportion age 16 or more with degree qualifications and above	20.3%	29.3%	39.6%	31.3%	42.5%	53.9%
Proportion age 16 or more with no qualifications	9.8%	13.2%	20.5%	9.8%	15.3%	24.3%
Proportion employed in professional, scientific and technical areas	12.8%	17.6%	21.7%	12.5%	15.6%	19.5%
Proportion employed in wholesale and retail trade	13.5%	17.5%	21.6%	10.9%	14.3%	16.8%
Proportion employed in education	6.8%	8.7%	11.9%	9.2%	11.8%	16.0%
Self-employed as proportion of all employed (exc students)	25.4%	30.4%	34.9%	24.9%	29.6%	34.7%
Looking after home as proportion of all 'inactive' aged 16 or more	11.7%	17.9%	23.0%	6.8%	11.8%	20.0%
Proportion of residents age 0-15 (exc students)	12.4%	16.6%	23.1%	12.7%	16.9%	25.0%
Proportion of residents age 65 and over (exc students)	14.8%	22.0%	29.3%	15.0%	21.6%	31.2%
Total Fertility Indicator (all age 0-9 cf age 25-44 females)	1.13	1.58	2.10	1.18	1.66	2.33
Migration Indicator (all age 25-34 cf 55-64 females)	1.42	2.23	3.73	0.97	1.73	3.66
Proportion of residents UK born	75.5%	84.1%	91.5%	74.1%	81.9%	90.2%
Proportion of Jewish HRP 1 family households: married or in civil partnership	54.7%	62.3%	70.6%	53.8%	62.5%	69.7%
Married Jewish HRP households as proportion of married + cohabiting	0.83	0.91	0.95	0.82	0.90	0.95
Proportion of Jewish HRP households that are single person	27.3%	33.7%	42.3%	24.2%	32.5%	40.2%
Percentage of Jewish HRP households owned or shared ownership	67.3%	80.2%	89.2%	62.8%	77.4%	85.5%
Percentage of Jewish HRP households with 2+ cars	20.6%	34.4%	49.0%	19.2%	33.2%	47.3%

Populations for the Characteristics	2001	2011
Total Jewish population	259,927	263,346
Jewish population aged 16+	215,350	210,426
Employed Jewish persons	115,717	122,846
Inactive Jews aged 16+	80,229	66,216
Jewish population (exc students)	242,031	243,010
Jewish females age 25-44	33,332	31,825
Jewish females age 55-64	15,132	17,360
Jewish HRP 1 family h/holds	66,217	65,859
Jewish HRP households	116,330	110,726

Note – 'Jewish HRP' indicates households in which the Household Reference Person identified as Jewish.

L, M, and N ratio was applied to the 2001 Group K total, to produce a 2001 'professional, scientific, and technical activities' proxy variable.

Thus it was possible to transfer the variable definitions used for the 2011 assessment to 2001 with only minor discrepancies. The scale of any discrepancies is returned to in examining the precise way in which the 2001 assessment should be implemented.

Differences in output availability between the two censuses

The geographic base used by Sapiro (2016b) for the 2011 assessment of Jewish residents employed a hybrid geography as Jews are very unevenly distributed across England and Wales (Simpson, 2012). About 90% of Jews live in middle layer super output areas[26] (MSOAs) containing 18 or more Jews. Contiguous MSOAs exceeding a population threshold based around this figure were identified, and the 29 accumulations of spatially contiguous MSOAs that exceeded a Jewish population of 200 were retained for analysis. More populous accumulations were subdivided into analysis areas of around 500 Jews along MSOA (or in the most densely Jewish populated areas, LSOA) boundaries to produce 407 analysis areas, each of whose Jewish population fell within a consistent range, but was sufficiently large to provide data reliability. Large sections of England and Wales (with a very low density of Jewish residents) were excluded from the assessment. Table 9.2 summarises the situation; see Sapiro (2016b) for further details.

ONS greatly eased earlier difficulties in comparing small areas between censuses by basing the 2011 output area system on that devised for the 2001 census; an approach made possible by the development work carried out by Samantha Cockings and colleagues (Cockings et al, 2011). Indeed, although ONS (2012d) reported that 2.1 per cent of 2001 MSOAs were changed for the 2011 census, the majority of changes were simply merging or splitting of 2001 areas, generally along boundaries of lower level areas; indeed, insofar as this study is concerned the issue is

[26] The basic geographic building block for outputs from the 2001 and 2011 England and Wales censuses is the Output Area (OA). These include about 300 residents in areas with a consistent housing type. ONS groups typically five OAs to form LSOAs, and typically five LSOAs to form MSOAs (with an average population of 7800) to provide outputs containing various levels of details of characteristics. See ONS (2012b) for more detail.

Table 9.2 Summary of the analysis area system for the 2011 classification

analysis area type	No. of areas	MSOAs covered	median number of Jews	Jewish share of population	Proportion of E&W Jews	Proportion of E&W total population
single LSOA	92	18	625	37%	23%	0.3%
single MSOA	129	129	552	9%	35%	1.9%
multiple MSOAs	186	2108	466	0.5%	32%	31%
All analysis areas	407	2255	512	1.3%	90%	33%
Rest of E&W	-	4946	-	0.1%	10%	67%
Total	-	7201	-	0.5%	100%	100%

one of data availability at different geographic levels rather than the census geography itself.

As part of the process of avoiding identification of individuals in the census outputs, ONS provides the greater level of detail in 2011 for regions, local authorities, wards and MSOAs, with less detail for LSOA and OA tabulations. In 2001, despite the average population of an MSOA being slightly larger than the average ward, the higher level of detail was provided for wards but *not* for MSOAs. Thus although 100% compatibility of analysis areas could be achieved, not all data were available directly for the preferred geographic level.

The primary source for calculating the 2001 variables needed for each analysis area were data relating to wards, though where MSOA or LSOA data were available (values for age 0-15, age 65 and over, UK born, room overcrowding, housing tenure, and car ownership) these were taken from the census outputs for MSOAs and LSOAs directly. The main issue for extracting data that needed to be taken from the census ward files related to the 64 single MSOA analysis areas that overlap ward boundaries. The issue of re-zoning census data has been the subject of many suggested algorithms (see, for example, Norman, Rees, and Boyle, 2003). However, a relatively simple approach could be adopted for this study. The proportion of each ward falling into each analysis area (based on simple land area) was extracted to form a preliminary set of ward proportion to analysis area conversion factors (see Qiu, Zhang, and Zhou, 2012). However, unlike most zonal conversions, the Jewish population for each final analysis area was already known, so the process was being used only to allocate the characteristics of that population. Through an iterative process the area-based proportions were corrected to match the known Jewish population of the analysis areas, ultimately producing a table with

much improved ward to analysis area proportions. An alternative approach of deconstructing ward data into its constituent OAs, and then (subject to adjustments needed because of ONS's anti-disclosure/small cell adjustment process) re-assembling the OA values to form the required MSOA, produces near-identical results.

Thus, through the processes outlined above, a 2001 dataset providing values for the 17 variables/characteristics of the Jewish population used in the geodemographic assessment was produced, for each of the 407 analysis areas.

9.3 Assessment methodology

The methodology for carrying out the 2011 geodemographic assessment is described in detail in Sapiro, 2016b. In summary, the following steps were undertaken:

1. Transform and standardise the variables.
2. Identify those cases where the closest neighbour distance can be regarded as an outlier, and (temporarily) exclude these cases from the dataset.
3. Use Ward's approach to cluster the cases (see Everitt et al, 2011).
4. Calculate the centre of each cluster and use as initial cluster-centres for a *k*-means analysis to produce final cluster centres (see Everitt et al, 2011).
5. Add the outliers back into the dataset and, using the final cluster centres, allocate the outliers to classes.

In order to apply the 2011 classification to the 2001 data, the same transformations and standardisations as used for 2011 were applied to the 2001 data (as used in step 1 above). The 2011 cluster centres file (produced in step 4 above) was then used to provide fixed cluster centres for a *k*-means assessment of the 2001 data (equivalent to step 5 above). The *k*-means algorithm was run twice; once with the 2001 data standardised around their own means and standard deviations, and also with the 2001 data standardised to the means and standard deviations of the equivalent 2011 variables. The first run can be thought of as producing a 2001 relative classification, and the latter a 2001 absolute classification. It might appear clear cut that the latter classification is the more appropriate to use to identify changes in analysis area to class allocation between 2001 and 2011. Indeed, this would clearly be the case if the 2001 variable definitions and census response rates

were absolutely identical to those in 2011, and if no temporal element to the classification needed to be considered; that is, whether the same value of a variable in 2001 and 2011 should automatically lead to the same overall social characterisation in both years.

An example of a temporal issue is the requirement for all nurses entering the profession after 2013 to hold a degree (Bernhauser, 2010). The holding of a higher level qualification is unlikely to lead to proportionate increases in socio-economic status / affluence than would apply to a less-formally qualified nurse in an earlier time period. Indeed, in the context of the proportion of degree holders variable more generally, it is worth noting that the number of people entering higher education in the UK has increased rapidly over the decade 'with total student numbers rising from just under 2 million in 2000–01 to around 2.5 million by 2010–11' (Universities UK, 2012, p5), and the number of people graduating with a first degree has increased by 17% between 2001 and 2011. However, the socio-economic prospects derived simply through being a degree holder have fallen during the period, with the proportion of those graduating in the previous six years working in jobs that do not require post-16 education rising from 27% in 2001 to 36% in 2011 (ONS, 2012f). Applying the absolute classification would thus imply a constant effect of a variable whereas a temporal trend might mean that a higher or lower value may be needed at different times to have to same socio-economic outcome.

In order consider the data consistency and temporal issues in more detail, the actual values of variables in the two census datasets have been reviewed, as set out in Table 9.1.

In line with the above discussion, the proportion of Jewish residents with degree level qualifications shows a marked increase between the two censuses. Some of the change in the proportion employed in education relates to a slight broadening of the scope of the SIC grouping between 2001 and 2011 to include less-formal training within the definition (Prosser, 2009). The issue of professional, scientific, and technical employment has already been discussed, and changes in other areas do not appear to have impacted on the resultant proportions, except for the 'inactive' variable that is related to a change in the way that those over age 74 are considered in the census outputs.

The overall conclusion is that the 2001 relative classification is the more appropriate one to use, because it should minimise the impact of any variable definition and temporal changes between 2001 and 2011, meaning that, for example, an analysis area that exhibits the 2001 average value for a variable in 2001 and the 2011 average for that variable in 2011 would (all other matters being equal) be allocated to the same class in each census.

9.4 Comparison of the 2001 and 2011 classifications

The 2011 classification (Sapiro, 2016b) split areas of Jewish residence into seven classes as described in Table 9.3. After first mention in the text below, classes are referred to by their letter rather than full name. The results of applying the 2011 class centres to the 2001 data are shown in Figure 9.1**.** The number of analysis areas allocated to each class in 2001 and 2011 and the changes between the two years are set out in Table 9.4**.** The changes are also summarised in Figure 9.2**.** The allocation and changes are represented in terms of the number of analysis areas, and the Jewish population of the areas falling into each class in 2011. The table indicates that almost 80% of areas and population are allocated to the same class in both 2001 and 2011. All of the analysis areas allocated to Class C (very young deprived traditionalists), and over 90% of those allocated to Class A (footloose cosmopolitan professionals) remain unchanged. Note that Vickers (2010) reports that 70% of output areas were allocated to the same class in his Output Area comparison of the whole population in both 1991 and 2001.

Certain trends can be readily identified:

- In NW London, the boundary between the Class F (affluent home-grown commuters) and Class G (comfortable home-grown elders) areas has 'retreated' northwards, expanding the area now classed as comfortable home-grown elders. A similar pattern is found in Leeds and north Manchester (and also in Trafford, Liverpool, Nottingham, and Redbridge). The Jewish population of the totality of areas falling into Class F in 2001 was unchanged over the 2001 to 2011 period; however, the sub-group of areas that changed classes from F to G lost 20% of their Jewish population. As part of ongoing

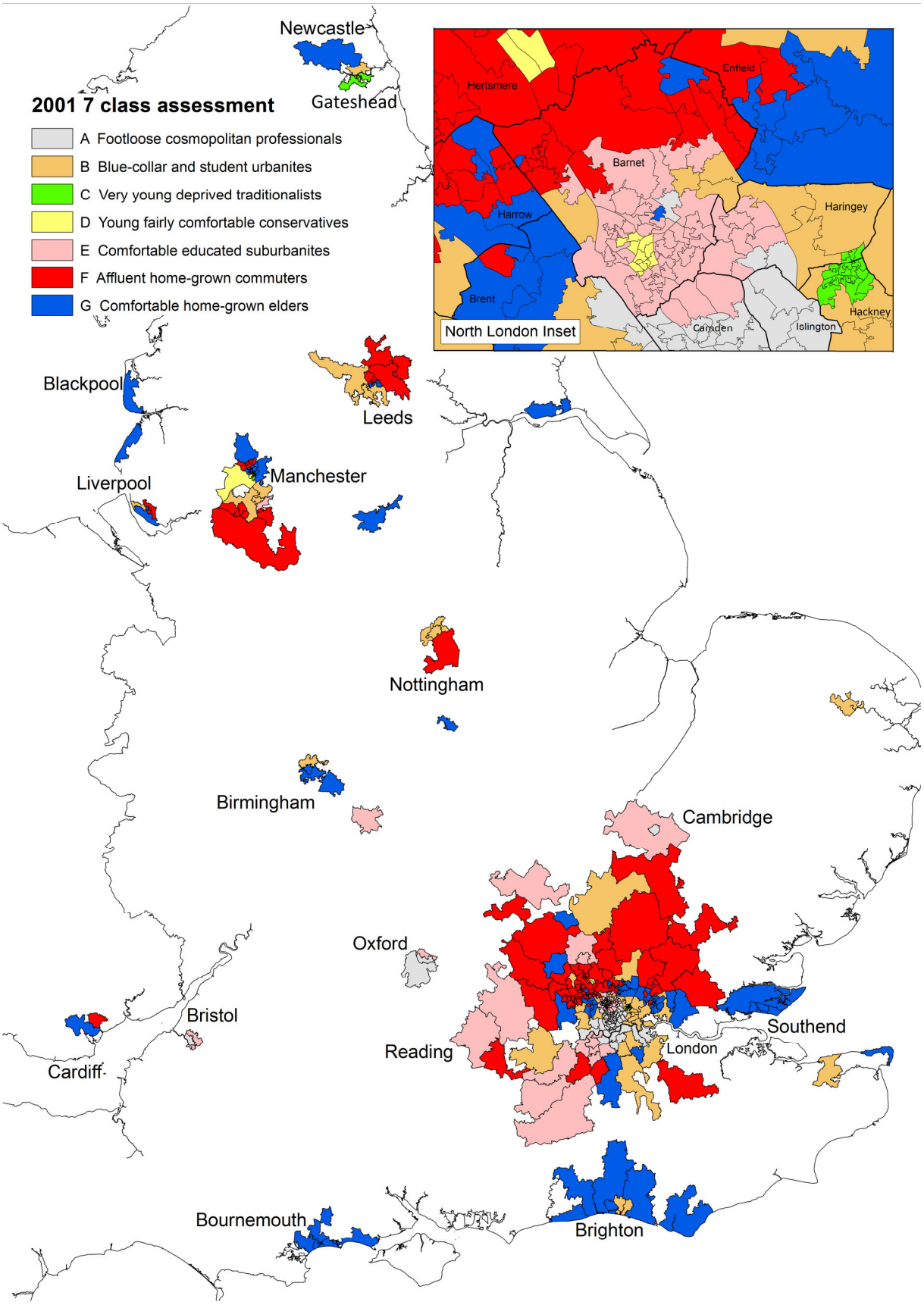

Figure 9.1 2001 seven class Jewish geodemographic assessment

Table 9.3 Geodemographic class names and locations

Class	Class Name	Principal locations
A	Footloose cosmopolitan professionals	Central London, Oxford, Cambridge
B	Blue-collar and student urbanites	East London and 'university' areas of provincial cities
C	Very young deprived traditionalists	Strictly-orthodox enclaves in Hackney, Gateshead, and Salford (Greater Manchester)
D	Young fairly comfortable conservatives	Orthodox areas in Barnet and Salford
E	Comfortable educated suburbanites	South Barnet and south west London/ Surrey/Berkshire
F	Affluent home-grown commuters	Hertfordshire/Essex/north Barnet, Greater Manchester and other provincial cities
G	Comfortable home-grown elders	London NW and NE fringes, coastal towns and some provincial cities

Table 9.4 Analysis area to class allocation 2001 and 2011

No of analysis areas 2011 class

2001 class	A	B	C	D	E	F	G	Total	unchanged	main changes	
A	55	1			2			58	95%	F to G	20
B	5	31			6		5	47	66%	G to B	9
C			27					27	100%	B to E	6
D		1	3	14	2	1		21	67%	E to D	6
E	2	5		6	54	4	2	73	74%	F to E	6
F		1		3	6	70	20	100	70%	B to A	5
G		9				1	71	81	88%	B to G	5
Total	62	48	30	23	70	76	98	407	79%	E to B	5

2011 population 2011 class

2001 class	A	B	C	D	E	F	G	Total	unchanged	main changes	
A	29241	319			1122			30682	95%	F to G	13532
B	2651	14666			2879		2454	22650	65%	G to B	3913
C			20720					20720	100%	E to D	3878
D		562	2890	13762	1494	505		19213	72%	F to D	3616
E	647	1773		3878	31103	3348	1333	42082	74%	F to E	3594
F		287		3616	3594	45176	13532	66205	68%	E to F	3348
G		3913				466	32747	37126	88%	D to C	2890
Total	32539	21520	23610	21256	40192	49495	50066	238678	79%	B to E	2879

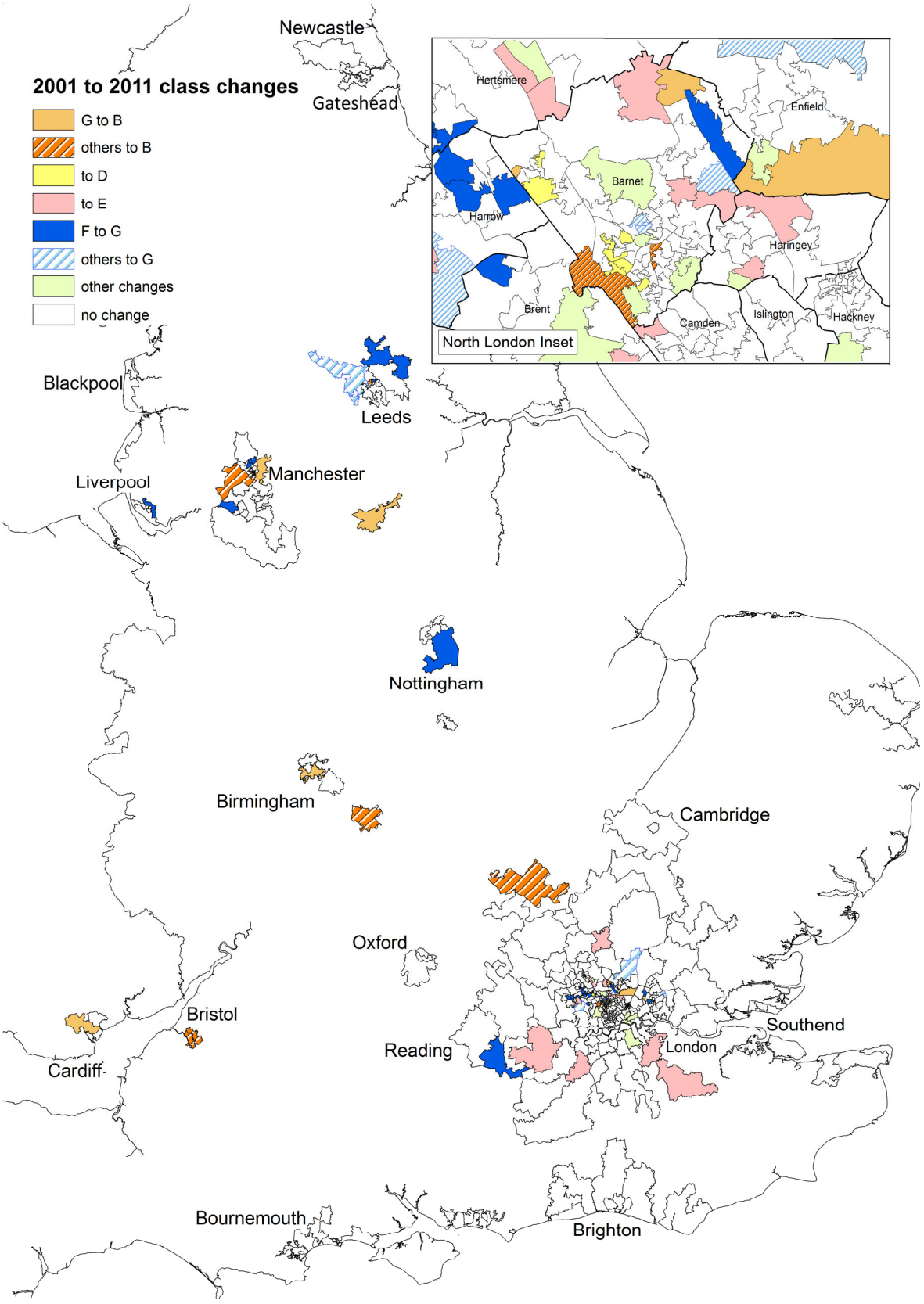

Figure 9.2 Class changes between 2001 and 2011 Jewish geodemographic assessments

suburbanisation/counter-urbanisation an element of the younger and more economically able have moved out of the more-inner areas, reducing the population and changing the age and socio-economic balance sufficiently for the areas to now fall into Class G.

- A change in popularity of some places for tertiary education has led to an increase in areas classed as B (blue collar and student urbanites) instead of Class E (comfortable educated suburbanites) or G.
- Conversely, improving fortunes have led to Class B areas being re-classed as A in east London and as Class E a little further north, with other expansion of Class E occurring in the Surrey area.

Some of these changes will relate to the different age structures and fertility levels of the various classes, and these are considered in the next section.

9.5 Population change between 2001 and 2011

The names allocated to some of the geodemographic classes indicate the dominant age group and thus allude to the likely direction of population change. Now that the classification has been applied to 2001 data, the change in population of classes can be examined in more detail. The ratio of the 2011 to 2001 Jewish resident population has been calculated for each of the 407 analysis areas. Figure 9.3 is a boxplot of those ratios, with the analysis areas categorised by the geodemographic class into which they fell in 2001.

As can be seen, the inter-quartile range for the analysis areas in Class G falls entirely below 1.0 and the population for this class is falling. Conversely, Class C shows an interquartile range of 1.4 to 2.0, indicating a rapid expansion (see also Vulkan and Graham, 2008; Graham, 2013a). Class D also demonstrates an expanding range, with classes A and B generally contracting slightly and E and F expanding slightly over the ten year period. These patterns are to be expected given the age profiles of the classes and reflect the very young, young, and elders epithets included in some of the class labels. Table 9.5 provides information on the total Jewish population falling into each class, and total and average population changes over the 10 year period, complementing Figure 9.3**.**

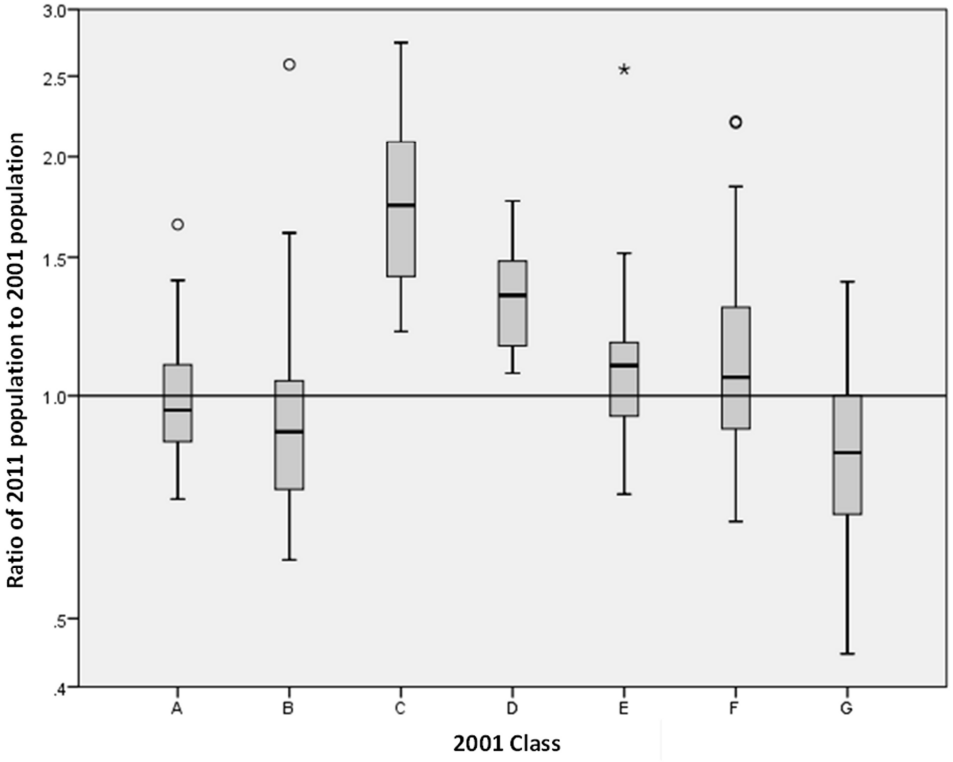

Figure 9.3 Class population change 2001 to 2011
(see Table 9.3 for class names)

Table 9.5 Summary of class population and changes 2001 and 2011

2001 Class	2001 Jewish Residents	2001 Jewish Residents (exc students)	2011 Jewish Residents	2011 Jewish Residents (exc students)	10 year change in Jewish Residents	10 year change exc students	2011/ 2001 Jewish Residents	2011/2001 Jewish Residents (exc students)
A	31154	28641	30677	28047	-477	-594	98%	98%
B	25380	22045	22626	19185	-2754	-2861	89%	87%
C	11499	10224	20720	18054	9221	7830	180%	177%
D	13338	12410	19213	17838	5875	5428	144%	144%
E	38592	36318	42067	39468	3475	3150	109%	109%
F	66203	62818	66205	62766	2	-52	100%	100%
G	47360	44791	37126	34798	-10234	-9993	78%	78%

Anecdotally, it is believed that Jewish communities in the north of England are suffering from a north to south drift in population. However, examination of the data for the 407 analysis areas shows that the seven most depleted (retaining between only 44% and 52% of their 2001 Jewish population in 2011) consist of four contiguous areas in Wembley (NW London) and three in Ilford (NE London).

Indeed, only two of the twenty three most shrinking areas (Hull and Southport) are outside of south-east England. At the other end of the scale are seven areas whose 2011 population ranges from 250% to over 500% of the 2001 value.

The growth ratio of eight areas can be considered to produce outlier results compared with their class inter-quartile ranges; all show higher growth than might be expected, and have been investigated further to ensure data validity. In all cases a logical explanation can be found – in most cases major housing development has taken place in the area; others are explained by an 'overflow' of a strictly-orthodox community into the adjoining MSOA, increased popularity of the University of Nottingham, and a greater non-recording of religion at Jewish seminaries in Gateshead in the 2001 census compared with the 2011 census.

9.6 Age profiles and sources of intercensal population changes

Whilst examination of the population and population change within classes can provide useful information, a much more detailed understanding of the changes can be arrived at through an examination of the age profiles within the categories and the change between 2001 and 2011. A very informative diagrammatic summary of the information available is achieved through plotting the 2001 and 2011 profiles on the same graph, but with the 2001 profile advanced by 10 years (see Ballard, 2004, for another example of the use of this technique). If there was no migration between categories, then the two lines would coincide (subject to births and deaths). Thus, difference between the lines is a useful starting point for assessing the relative importance of natural change and migration to the intercensal population change. Figure 9.4 shows the graphs for the Jewish population of England and Wales as a whole. The difference between the two lines in the (2011) 0 to 9 year area is largely attributable to births; growth in the 10 to 39 age range represents international immigration; losses from age 40 upwards represent international emigration, with deaths taking over as the main source of losses, particularly in the 70 plus age groups. The shape of the graphs are, however, markedly different for each of the geodemographic classes. Figure 9.5 shows the equivalent diagrams class by class, and these are now described as they are an important precursor to using the analysis to carry out population projections.

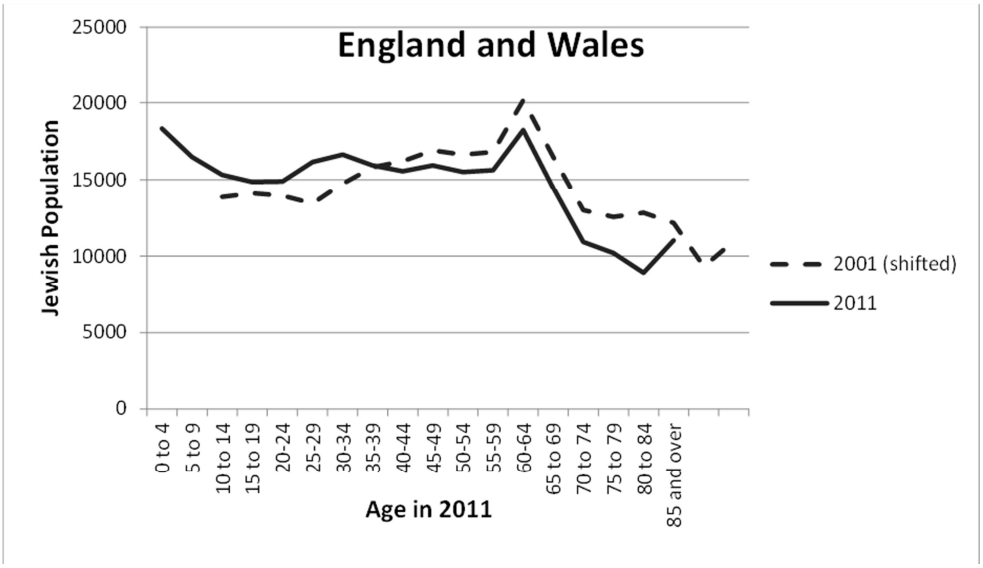

Figure 9.4 2001 and 2011 Jewish age profiles – England and Wales

Class A and B both show distinct peaks. In the case of Class B this represents in-migration of students, who then largely move on once their studies are complete. The Class A peak is later – early twenties to early thirties; however, this too seems to be relatively short-lived, with an equivalent level of departures over the subsequent 10 to 15 year period, probably due to a combination of the footloose cosmopolitan character of the population, the nature of employment taken up, and a preference for families to live elsewhere than inner London (where Class A is focused). The relatively low number of young children and the generally downward age profile after the peak are clear in both diagrams.

The diagrams for Classes C and D are markedly different to A and B. Both classes show a very high number of young children; Class C shows a minor student age gain (and possible later retention); whereas Class D shows a net outflow post-school age (with post-university returns/replacement). Both classes exhibit a small elderly population. Classes E and F show more stable profiles, with some post-school losses and later returns/replacements. Class G illustrates lower births than the other classes, a generally rising age profile (until mortality takes over) and a clear net out-migration from mid-twenties upwards.

Examination of the underlying data in more detail allows a broad assessment of the relative importance of births, deaths, and net migration to population change in each class to be determined (see Voss et al, 2004; Simpson, Finney, and Lomax, 2008; Finney and Simpson, 2009). The difference between the number aged 70 and over in 2011 compared with those aged 60 or more in 2001 (plus a small proportion

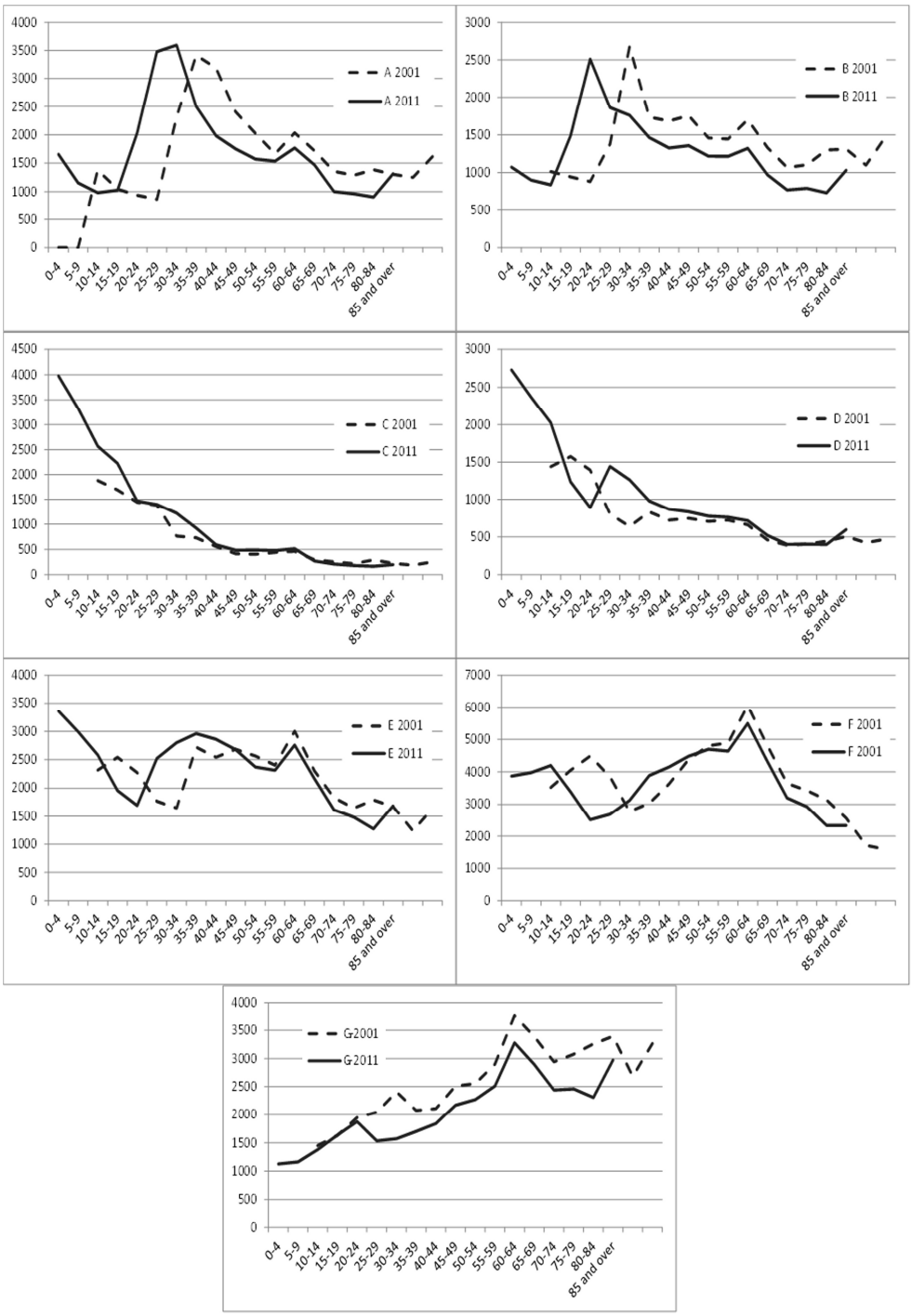

Figure 9.5 2001 and 2011 Jewish population age profiles by class

of the difference in the next younger 10 year band) has been taken to represent inter-censal deaths. The number of 0-9 year olds present in 2011 has been used as the starting point for 2001 to 2011 births; this figure has been adjusted to allow for migration of 0-9 year olds by assuming that their rate is half that of the net rate for their likely parents' age band. That rate has been assessed by comparing the number of 35-44 year olds in 2011 with the number of 25-34 year olds (a range avoiding

distortion due to post-education student moves) in 2001. Where net in-migration has occurred, the number of 2001 to 2011 births is fewer than the number of 0-9 year olds present in 2011, and net out-migration produces a figure for births in excess of the number of 0-9 year olds present. All other changes between the 2001 and 2011 age profiles are assumed to represent net migration; the gross values of in and out migration within age groups cannot be ascertained from these data. Table 9.6 summarises the changes to the overall 2001 population of each class that various elements make up.

The figures for births and deaths for England and Wales as a whole (14% and 12% respectively) represent 35,100 births and 30,800 deaths. These are in line with the estimates prepared by the Board of Deputies of British Jews in their annual community statistics report (Vulkan, 2013).

The variation in importance of the different contributors to change between the classes is quite stark. It is important to note that the analysis is by each geodemographic class – so in and out migration refers to movements between classes (or internationally); a move within class, even if over a large distance, would not contribute to the net change.

Table 9.6 Summary of contributors to class population change 2001 to 2011

Values are percentages of class 2001 population

	England & Wales	A	B	C	D	E	F	G
Birth gains	14	10	9	56	35	16	11	5
Net Child departures (-) or arrivals (+)	0.5	-3	-1.4	11	8	2	2	-0.5
Net Post-school departures (-) or student arrivals (+)	0.7	3	9	5	-6	-3	-4	-0.1
Net 20s departures (-) or arrivals (+)	2	12	-2	4	9	5	-1.2	-3
Net 30s/40s departures (-) or arrivals (+)	-0.6	-9	-4	2	3	1.4	2	-2
Net Post 50 departures (-) or arrivals (+)	-2	-3	-4	1.4	2	-1.4	-2	-3
Death losses	-12	-13	-16	-6	-6	-10	-8	-18
Natural Change (Births less Deaths)	2	-3	-8	50	28	5	2	-13
Migration change	0.3	1.2	-3	23	16	4	-2	-9
Overall change	2	-2	-11	73	44	9	-0.2	-22

9.7 Population change in communities

To address this aspect, equivalent graphs and tables can be built for individual accumulations or communities. Just a small number are considered here – Greater Manchester (to show that in larger communities there can be distinct differences in sub-areas); Liverpool (to complete the picture for larger communities

in north west England); and two rather contrasting areas in north eastern England: Gateshead (the accumulation with the largest intercensal growth in England and Wales: over 90%); and Hull (with the largest loss: almost 50%). The information is presented in Figure 9.6 and in Table 9.7; all accumulations where the Jewish population change between 2001 and 2011 was more than 20% are listed in Table 9.8.

Table 9.7 Summary of contributors to accumulation population change 2001 to 2011

	Contribution as percentage of 2001 area population							
	Prestwich, Whitefield and Bury	Broughton Pk area	Manchester and Salford Central	Trafford South, Stockport and E Cheshire	Gtr Man-chester Total	Liverpool	Gateshead	Hull
Birth gains	11	42	9	9	21	4	38	1
Net Child departures (-) or arrivals (+)	1	14	-2	3	4	-1	6	-1
Net Post-school departures (-) or student arrivals (+)	-4	-6	14	-4	-2	3	33	-1
Net 'Twentysomething' departures (-) or arrivals (+)	1	9	-12	-2	1	-8	-28	-5
Net 30s/40s departures (-) or arrivals (+)	1	4	-3	3	2	-2	2	-2
Net Post 50 departures (-) or arrivals (+)	0	1	-1	0	0	-2	0	-6
Death losses	-11	-8	-12	-11	-10	-17	-3	-32
Natural Change (Births less Deaths)	-1	35	-3	-2	10	-14	35	-31
Migration change	-1	22	-4	-1	5	-9	13	-15
Overall change	-2	57	-8	-3	15	-22	48	-46

The profiles for each accumulation reflect the underlying classes to which the analysis groups in those areas have been allocated. Thus, Whitefield, Prestwich, and Bury together with Trafford South, Stockport and East Cheshire reflect a mixture of F and G class analysis groups, whereas the quite different pattern in Broughton Park results from its Class C and D make up. The Manchester and Salford central area derives most of its characteristics from Class B. A fifth diagram totals up these four elements to produce a balanced pattern that belies the variation across the area, though the high birth rate in the Broughton Park area still shows through. The pattern for Liverpool is largely a reflection of the F and G classification of the majority of analysis groups in the area. However, the student age spikes arise from a Class B student area analysis group; the scale of the incoming student peak masking the post-school losses of the indigent community.

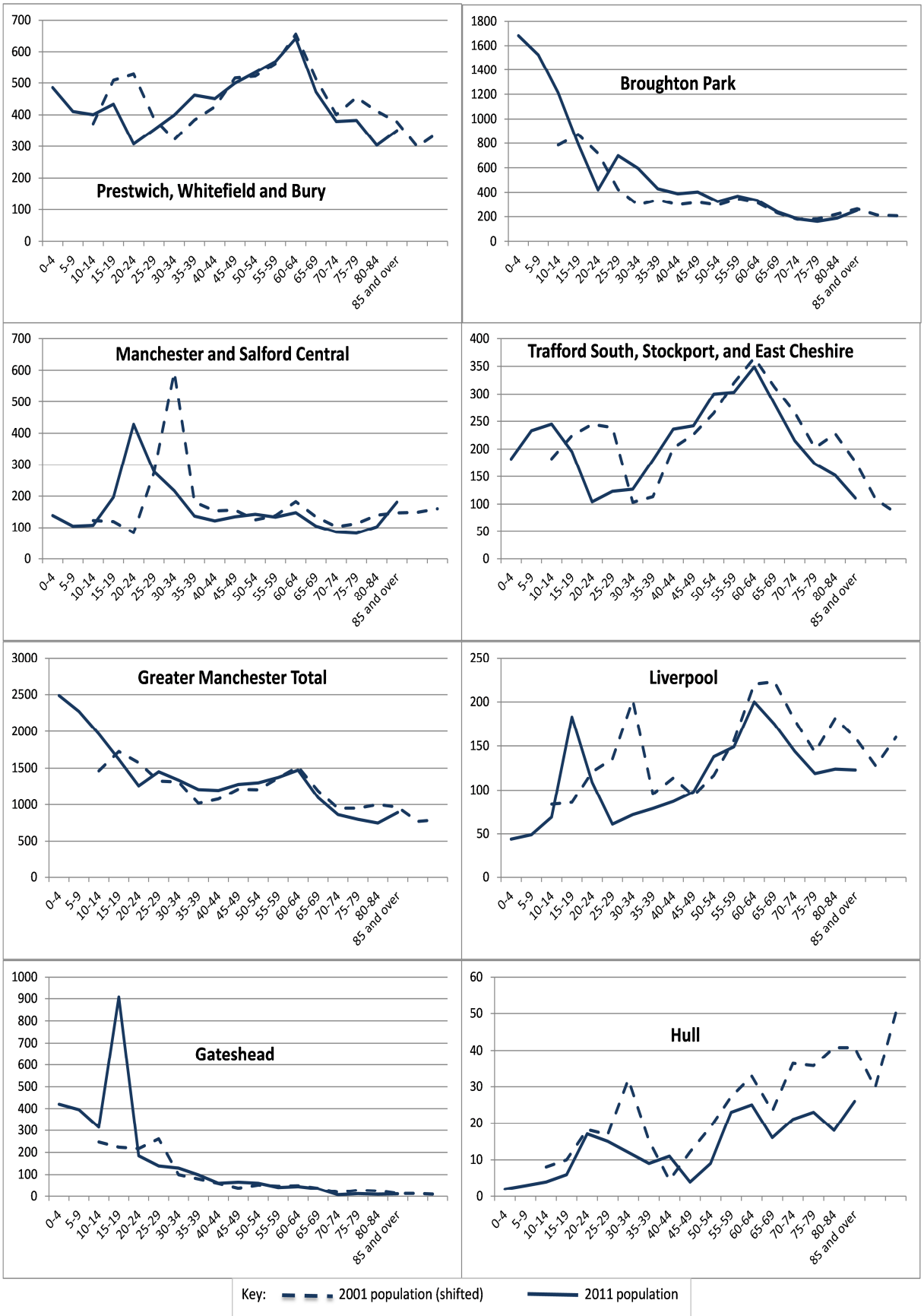

Figure 9.6 2001 and 2011 population age profiles – selected communities

Table 9.8 Summary of accumulation population and changes 2001 and 2011

Rank	Locality	Class of constituent groups (in 2011)	2001 Jewish Residents	2001 Student Presence (if >15%)	2011 Jewish Residents	2011 Student Presence (if >15%)	2011:2001 Jewish Residents (exc students)
1	Gateshead	C	1541	31%	2939	34%	183%
2	Stamford Hill	C	9282		15931		169%
3	Broughton Park area	C and D	6495		10197		156%
4	Golders Gn & Hendon South	D	9230		13039		141%
5	Warwick	B	129	21%	208	31%	140%
6	Hertsmere, Hatfield, & London Colney	F with E	11503		15628		135%
41	Blackpool & St Annes	G	705		567		79%
42	Thanet	G	275		220		79%
43	Inner East and NE London	B	6069		4837		78%
44	Sheffield	B	621	17%	544	26%	77%
45	Liverpool	G with B, F	2601		2023		76%
46	Newcastle	G with B	846		660		76%
47	Croydon and Streatham	B	1617		1227		76%
48	Harrow, Hillingdon and Wembley	G with F	19205		14318		74%
49	Birmingham & Solihull	G and B	2205	29%	1871	38%	74%
50	Redbridge, Havering and Chingford	G	16813		12157		72%
51	Leicester	G	427		299	17%	66%
52	Luton	G	534		326		62%
53	Southport	G	568		349		61%
54	Hull	G	460		244		54%

The Hull graph illustrates a community in severe decline. Although broadly following the pattern for Class G groups, the balance of few births, an ageing community and proportionally many deaths has led to more extreme values than typical for the class.

Gateshead and institutional under-recording

The Gateshead diagram, certainly as regards the 2011 line, varies noticeably from the global Class C diagram included previously, in the very large student-age spike. This is easily explained through the presence in Gateshead of a number of Jewish seminaries, including the largest single institution of this type in Europe. Indeed, the greater surprise is that there is no equivalent spike in the 2001 line, and (given that the major teaching institutions have been in existence in Gateshead for a number of decades) this raises the issue of under-counting of Jews in the 2001 and

2011 censuses. Graham and Waterman (2005) discuss the potential for a Jewish undercount in the 2001 census at some length, and this matter has already been discussed in some detail in Chapter 2, so the background is not considered further here.

The analysis and comparison of 2001 and 2011 data, which are the focus of this chapter, do not really provide any direct way of commenting on or assessing the level of undercount that could exist, but it may be possible to provide some assessment of the change in the level of under-reporting, in a limited way. As has already been noted, the overall growth in the census-reported Jewish population between 2001 and 2011 in the Gateshead accumulation as a whole is around 90%, and for the Gateshead 028 MSOA analysis group the 2011 population is over five times the 2001 value. For class C areas as whole, a growth of 70% would be more typical. Given the presence of a number of Jewish (boarding) seminaries in Gateshead, and the centrality that these facilities have for the accumulation as a whole (well over 40% of employed persons work in education), a breakdown of the census data for the main MSOAs in the Gateshead community may be helpful (see Table 9.9). In addition to providing information about the total numbers of Jewish individuals residents in each area, the census also provides information on the number of households. For 2001, a breakdown at MSOA level is available of Jews (by gender) living in various types of communal establishment (all of whom are in educational/hall of residence accommodation). In 2011, such figures are only available at local authority level. However, there is a table (for MSOAs) that provides information on persons living in households, from which the numbers not in households can be deduced. Although these latter figures are not produced by gender, a gender split by age group for all residents does allow the total by MSOA to be split between genders (given that the total for the local authority by gender is known) within only a very narrow margin for error. The italicised figures in the table have been estimated in this way.

The table indicates that there has been a major increase in the number of recorded households (and residents within those households) between the two censuses. However, the Gateshead graph in Figure 9.6 shows that (apart from the student age issue) there is a high degree of compatibility between the 2001 and 2011 lines (with minimal net migration), meaning that the large increase in households is

Table 9.9 Breakdown of census-recorded Jewish population of Gateshead 2001 and 2011

MSOA	All Jewish Residents		Jewish HRP h/holds		People in households		in all educational establishments		in male educational establishments		in female educational establishments	
	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011	2001	2011
Gateshead 008	860	1483	165	236	860	1177	0	306	0	*306*	0	*0*
Gateshead 010	199	432	39	65	178	416	21	16	0	*0*	21	*16*
Gateshead 020	21	12	0	1	0	12	21	0	21	*0*	0	*0*
Gateshead 021	3	26	0	5	3	25	0	1	0	*0*	0	*1*
Gateshead 027*	330	301	3	6	25	27	305	274	0	*7*	305	*267*
Gateshead 028**	103	577	16	61	103	418	0	159	0	*117*	0	*42*
Total (6 MSOAs)	1516	2831	223	374	1169	2075	347	756	21	430	326	326
'Gateshead accumulation'	1541	2939	223	396	1186	2168	347	756	21	430	326	326

* was four LSOAs (Gateshead 006 A,C,D, and E) in 2001

** was three LSOAs (Gateshead 006 B,F, and G) in 2001

Source: 2001 census tables cast10, cast11, s103, s161; 2011 census tables DC/LC1202EW, DC/LC2107EW, DC/LC4417EW, DC4409EWla

likely to be a consequence of the age profile of the population (more children born in existing households over the intercensal period, and 2001 home-living adolescents forming their own households and families in 2011), and NOT the result of individuals deciding to tick the Jewish box in the 2011 religion question, having not done so in 2001. However, the table does show a clear-cut difference in response between 2001 and 2011 for the educational communal establishments. The comparison for women's seminaries is broadly consistent between the two years; for men's establishments it is clearly not. It appears that a large establishment in Gateshead 008 MSOA chose to respond in 2011, having not done so in 2001[27], together with a medium size college in Gateshead 028. The former MSOA is the location of the main Gateshead Talmudical College (Beit Yosef Yeshiva Gateshead); in the latter, Yeshiva Tiferes Yaakov can be found. One of the medium size institutions, the Sunderland Talmudic College (so named as it was originally based in Sunderland, but relocated to Gateshead in the late 1980s) is located in Gateshead 010 – clearly it is omitted from both censuses. Setting aside any possible complete omissions from the census, and making the simple assumption that the 2001 size of institutions recorded only in 2011 would have matched the 2011 size, then the overall Jewish population growth in Gateshead 028 would have been a 120% increase, and for the Gateshead accumulation as a whole, a 48% increase. Such changes would have removed Gateshead 028 from the analysis group growth outlier list (as mentioned in section 9.5), and would place Gateshead as a whole in a similar growth bracket to other Class C and D concentrations. (Note that the figures in Table 9.7 for Gateshead have been modified to reflect this adjustment, though the graph retains the original data).

[27] A closer examination of the 2001 census outputs indicates that in the whole of Gateshead only two wards have male residents in educational communal establishments: 21 Jewish residents in Low Fell ward (MSOA Gateshead 020), and 275 religion not stated residents in Bensham ward (MSOA Gateshead 008). It is highly likely that these 275 residents are located in the Gateshead Talmudical College, but did not answer the religion question, but are actually recorded in the census. For completeness, as regards female residents, in addition to the 306 and 20 Jewish residents in Bensham ward (LSOA Gateshead 006E) and Saltwell ward (MSOA Gateshead 010), there were 13 and 16 religion not stated residents in these same two wards.

9.8 Projecting future population levels

The technique of comparing the 2001 and 2011 data, and the estimation of the relative importance of natural change and migration to intercensal change can be extended to produce a general indication of possible future levels of the Anglo-Jewish population, on the basis that 'an area's age-sex structure is highly predictive of the future population' (Holdsworth et al, 2013, p55). The approach used is based on the cohort component method (Hinde, 2014; Smith, Tayman, and Swanson, 2001) and, to improve the accuracy of the projections, the population has been categorised, based on the 2001 geodemographic classification. Although (in earlier sections) separate estimates have been made of the contribution of birth, death, and migration to population change, the data do not provide sufficient information to fully disentangle these elements, so a detailed calculation of the future levels of these elements individually cannot be achieved. However, some comparison of the levels of fertility and mortality in the different classes can be established. A 'fertility proxy' variable was included in the geodemographic classification – a child/woman ratio based on the number of 0-9 year old children and 25-44 year old women (an age range selected to avoid any student-related distortion) (Sapiro, 2016b). An indication of mortality can be gleaned by measuring a survival rate for an age cohort between the censuses. If there is a material amount of migration to/from an area in a different class, then some distortion of the figures will occur, but migration within class has no impact on the calculation. Table 9.10 summarises the assessment.

Insofar as the fertility indicator is concerned, both Jewish and general fertility levels have increased over the 2001 to 2011 period. This increase reflects a pattern

Table 9.10 Summary of fertility and mortality indicators by class

Class	A	B	C	D	E	F	G	All E&W Jews	All E&W residents
Fertility proxy									
in 2001	0.90	1.19	6.58	3.62	1.79	1.79	1.32	1.68	1.66
in 2011	0.96	1.48	7.13	4.13	2.03	2.17	1.41	2.18	1.72
Rank	7th	6th/5th	1st	2nd	4th	3rd	5th/6th		
Proportion surviving 10 years from 2001									
age 65 or over	0.46	0.41	0.47	0.62	0.56	0.61	0.49	0.52	0.53
age 70 or over	0.40	0.34	0.38	0.54	0.47	0.52	0.42	0.44	0.43
age 75 or over	0.32	0.27	0.30	0.43	0.37	0.40	0.32	0.34	0.32
Rank	=5th	7th	=5th	1st	3rd	2nd	4th		

seen in other European countries, resulting from a shift in age-specific fertility as women who postponed births in their 20s in the 1990s caught up by having children in their 30s in the 2000s, a situation that may now have stabilised (Kohler, Billari, and Ortega, 2002; Sobotka, 2004; Bongaarts and Sobotka, 2012). The overall rate for Jews has moved from around the national average to being well in excess of it; the indicator has increased for all classes, and the relative ranking of each class has hardly changed. This, however, masks considerable variation within the Jewish community. The very high levels of fertility found in the strictly orthodox areas (Classes C and D) mask the level of change found elsewhere, as the number of 25-44 year old Jewish females and 0-9 year old Jewish children approximately doubled in the Class C and D areas between 2001 and 2011, whereas numbers for the other classes overall fell slightly. Excluding Class C and D areas, the child/woman ratio for the Jewish population was 1.46 in 2001 and 1.64 in 2011 – that is, below the values for the wider population, but by a smaller margin in 2011.

As regards mortality, expressed in terms of cohort survival, Jews exhibit similar levels to the population at large – just over half of those aged 65 or more survived 10 years with the proportion being just over two-fifths and around one third for those aged 70 or over, and 75 and over respectively. There is a material variation between classes, with inner urban and deprived classes faring less well than other classes, largely reflecting the well-established linkage between socio-economic status and mortality (Smith, Blane, and Bartley, 1994; Hunt and Batty, 2009; Mackenbach et al, 1997). However, the survival rate for Class D (young fairly comfortable conservatives) appears to be better than their more affluent neighbours, and the low rate for Class A probably arises from the presence of a residual elderly more-deprived element to the Jewish population, not associated with the well-qualified professionals who dominate the younger age ranges in Inner London.

This investigation of fertility and mortality confirms the benefit to any projection in considering the population by class, but raises the question of the appropriate manner in which to project future births and deaths. Does the increased fertility measure for 2011 indicate a level likely to be sustained into the future, or is it an anomaly with the 2001 level representing the longer term situation? Despite extensive consideration of modern variation in fertility levels (for example, by Lesthaeghe and Willems, 1999; Lesthaeghe, 2010), ‘what happens next is far from

clear.' (Bongaarts, 2002, p439). Delayed child-bearing in the 1990s will have suppressed the 2001 calculation, and 'catching up' in the 2000s would mean that the 2011 calculation over-shoots the general trajectory of fertility change. For the purposes of this high-level assessment, with the projection limited to the relatively near future, child/woman ratios for 2021 and 2031 based on both the 2001 and 2011 child/woman ratios by class have been used to produce a range for the number of 0-9 year olds.

In order to ensure a cautious approach is being taken, an adjustment has been made to the fertility assumption for the strictly orthodox Class C and D areas. Demographic Transition Theory anticipates that fertility levels will fall in all parts of the world from high levels to replacement levels or below and, indeed, in western Europe the process is largely complete (van de Kaa, 1996; Bongaarts, 2002). However, this does not mean that small minority groups necessarily follow the same trend (or at the same time) as the population as a whole. Indeed, it might be argued that, for these groups, reproductive behaviour is strongly linked to religious and cultural traditions. Conversely, it is clear that the fertility levels for one 'orthodox enclaves' class, Class D, are lower than for Class C, and there is evidence of a small drift away from strict orthodoxy by the next generation (Graham, Staetsky, and Boyd, 2014). The presented projection is based on there being 10% fewer births per decade in the Class C and D areas than would be the case without this adjustment.

Of course, mortality does not stand still either, with life expectancy continuing to increase (see, for example, Oeppen and Vaupel, 2002). It does not follow that improvements will occur evenly across a nation or, more specifically, across a minority subpopulation, nor are the changes likely to materially impact on a 10 or 20 year population projection. Nevertheless there is strong evidence of continuing improvement, both nationally and at a local level (Mayhew and Smith, 2013; Bennett et al, 2015) at a similar rate to the medium term trend. A simple comparison of the age profile for the England and Wales total population taken from the 1991, 2001, and 2011 census tables indicates that there has been a 10% increased likelihood of 10 year survival, assuming that net international migration flows are minimal, in the oldest age group. As an example, the number of persons aged 85 or more present in 2001 was 29% of the number aged 75 or more present in 1991; the equivalent calculation for 2011 compared with 2001 was 32% - a relative increase of

10%. Almost identical improvements are found for survivors aged 75 to 79 and 80 to 84. A conservative projection range has been produced by considering two scenarios: that the survival rates established over the 2001 to 2011 period will remain in force until 2031; and that survival levels will be 10% higher than those rates.

Other changes in the next twenty years for each class will arise through migration. For the Jewish population of England and Wales as a whole, the net level of international migration is small (Table 9.6 indicating a contribution to population change of less than 1% between 2001 and 2011). The data available do not allow anything other than a continuation of that level to be assumed. In reality, therefore, net migration will have little impact on the projections for England and Wales as whole; however, inter-class migration has been projected forward so that the contribution of each class to the future total can be understood and any projection could be broken down by locality. Thus the projection assumes that, in general, for each five year band within each class, the ratio of 2011 population to 2001 population (10 years younger) will apply in projecting forward from 2011 to 2021, and from 2021 to 2031. However, the scale of migratory 'spikes', associated with school-leavers moving to university, and from university to first employment, or other major life-course moves occurring in young adulthood (clearly present in many of the diagrams within Figure 9.5) are not a function of the size of Jewish population in the receiving area/class. The attractiveness of a particular study institution, or (for example) Central London for a particular employment type, will be more important determinants. In these cases, the absolute level of net migratory change has been assumed to continue into the future, save where the population of an age group is in decline.

A number of caveats must be attached to the calculation. Of major importance is that it assumes a similar level of Jewish response or non-response to the census question on religion at both 2001 and 2011 censuses, and thus predicts the number of people who would (similar circumstances holding) identify themselves as Jewish in a future census, rather than any other definition of a member of Anglo-Jewry (see, for example, Vulkan, 2013). Clearly, as set out above, it also assumes that the migratory behaviour in the future will match that which occurred in the 2001 to 2011 period and the view that has been taken as regards life expectancy and fertility rates is appropriate.

In view of all these reservations, projected figures have been rounded, and extend only to 2021 and 2031. They have also been presented as a range; however this should not be interpreted as the limits of likelihood or a confidence interval. This approach is merely intended to allow the sensitivity of the overall projection to credible variations in the fertility and mortality assumptions to be understood. They should be thought of as giving a general indication of trajectory. The assessment has been made class by class, and summed to produce an England and Wales national estimate (allowing for Jews living outside of the classified areas). Table 9.11 summarises the projection.

Table 9.11 Jewish population projection

Jewish Population '000	Class							England
	A	B	C	D	E	F	G	& Wales
2001 census	31	25	11	13	39	66	47	260
2011 census	31	23	21	19	42	66	37	265
2021 projection	30-31	21	34-35	27-28	45-46	63-65	29	275-281
2031 projection	31	21	54-57	35-39	47-50	58-61	22	292-306

England and Wales	Age Range						
	0-14	15-29	30-44	45-59	60-74	75 and over	All Ages
2001 census	42	44	50	53	38	32	260
2011 census	50	46	48	47	44	30	265
2021 projection	57-61	50	50	45	43	30-32	275-281
2031 projection	62-72	59-61	53	45	39	33-36	292-306

The table indicates that the strictly orthodox groups (Classes C and D), which formed about 9% and 15% of Anglo Jewry as reported in the 2001 and 2011 censuses respectively, would grow to 30% of the total by 2031, driving up the overall size of the population through their high fertility levels (see also Staetsky and Boyd, 2015). Large increases in strictly orthodox enclaves mask major falls in population in Class G areas, which are largely focused in the Harrow/Wembley area of NW London, Redbridge and adjoining areas in NE London, and many of the medium/larger sized provincial communities (such as Leeds, Brighton, Bournemouth, Southend, Liverpool, and Birmingham). This will increase the proportion of Anglo-Jewry to be found in the London area, with all provincial communities (except Gateshead and Greater Manchester) reducing in size.

This future projection is in contrast to the historic trend. Although census data by religion are not available prior to 2001, the Board of Deputies of British Jews

research unit has been preparing estimates of the size of the British Jewish population since the 1960s (building on earlier pioneering work of others). Schmool and Cohen (1998), summarising the work of earlier studies (Prais and Schmool, 1968; Haberman, Kosmin, and Levy, 1983; Haberman and Schmool, 1995), indicate the size of the British Jewish population as set out in Table 9.12. They also state that 'numerically British Jewry reached its peak immediately after the Second World War' (Schmool and Cohen, 1998, p5), so the trend had been a rising one for the first half of the twentieth century, and then a falling one for the second half. The 2001 census thus marks a low point in the Jewish population[28], with a small increase between 2001 and 2011. The analysis presented in this paper indicates that the trend is now an increasing one, albeit with a strong geographic focus (see Figure 9.7).

Table 9.12 Board of Deputies British Jewish population estimates

Year	Population '000
1950	430
1960-65	410
1975-79	336
1984-88	308
1989-93	295
1995	285

Sources: Prais and Schmool (1968); Haberman, Kosmin, and Levy (1983); Haberman and Schmool (1995)

Of the assumptions that need to be made, predicting future fertility levels is the most difficult. Therefore, a number of sensitivity tests have been undertaken. These indicate that the fertility rate would have to fall by 25% immediately, and a further 25% after 10 years for the mainstream classes, and by 40% immediately and a further 40% after 10 years for the very young deprived traditionalists class, for the projected future population growth to become negligible; such fertility level changes are beyond the likely range. We can thus be confident that the change in population over time presented here is in the correct direction.

[28] Although the Board of Deputies figures refer to Great Britain and the census data are for England and Wales only, the Jewish population of Scotland (2001 census) was below 6,000, leaving 2001 as the population low point for England and Wales.

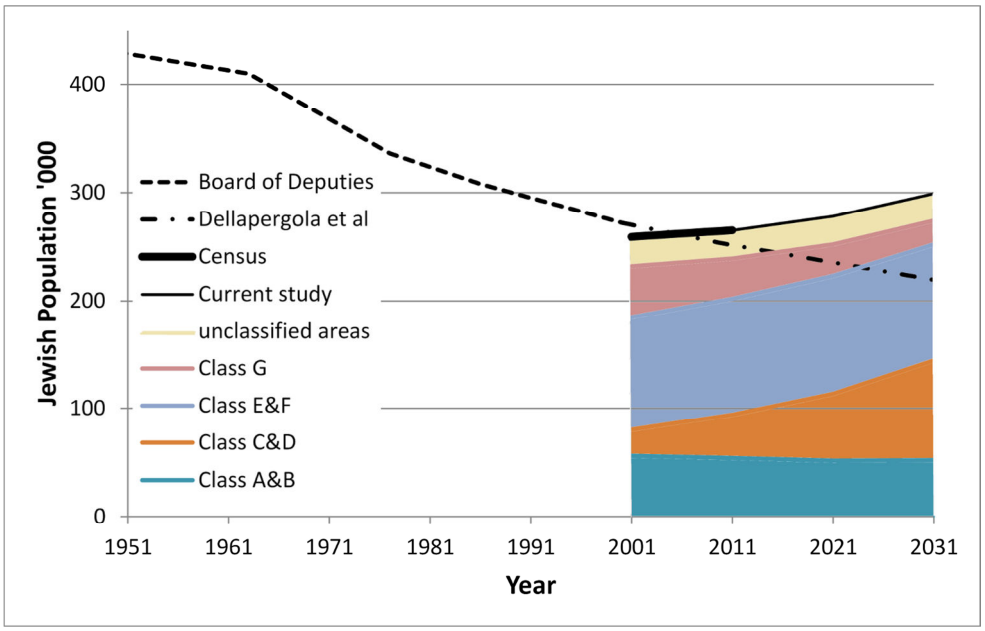

Figure 9.7 Jewish population estimates, census values, and projections

9.9 Discussion and conclusions

The work reported in this paper demonstrates that, despite a number of hurdles, it has proved possible to apply a geodemographic assessment carried out using data from one census to a preceding census. There have been a few issues of compatibility in data definitions and geographic availability but these, and possible temporal changes in the impact of certain variables, have been mitigated by the use of a relative assessment, whereby 2001 variables were standardised to their own means and standard deviations, rather than the absolute values derived from 2011 data. A comparison of the two assessments has shown that about 80% of the analysis areas have fallen into the same class in both censuses, and that many of the changes that have occurred have a spatial element to them – in that changes of the same class to class type have been frequently found in contiguous groups, with the territorial extent of one class 'advancing' and another 'retreating'.

An examination of the ratio of the 2011 to 2001 population by class confirms the general trajectory of population that can be deduced from the age profile within each class derived from either the 2001 or 2011 census. The strictly orthodox enclaves (Classes C and D) are expanding at a high rate (see also Graham, 2013a), inner urban areas (Classes A and B) are mainly shrinking slowly, whilst some of the suburban / commuter belt areas (Class E and F) are expanding slightly or maintaining their numbers. The Class G areas (which include suburban and coastal communities)

are shrinking, some at a high rate. The impacts of these type of change are returned to in discussing the future projected Anglo-Jewish population.

The anecdotal view that communities in the south are expanding while those in the north are fading away is only partly confirmed – many of the northern communities, those that fall into Class G, are indeed shrinking, and some of the London area groups are increasing in size. However, the population levels amongst those large areas of Class G characteristics in NW and NE London are shrinking at comparable rates to the provincial communities.

The presentation of Jewish age profiles from the two censuses, particularly in diagrammatic form with the earlier census data shifted by the intercensal period, provides a very easy to comprehend picture of the underlying causes of the overall population change in the 10 year period. This has allowed the relative importance of fertility, mortality, and migration in contributing to the change to be derived, and the differences between the various classes are large.

The breakdown of the source of intercensal change assists greatly in carrying out a population projection. The types of data required to carry out a traditional cohort component method (for example, age-related survival rates) are not available for the geodemographic classes around which the projections have been based, so the absolute and proportionate changes that have occurred between 2001 and 2011 have been used to produce some overall factors to be applied to the 2011 data to produce a 2021 estimate, and from that estimate, a projection for 2031.

A number of caveats have already been set out as regards the accuracy of the projection. In particular, what is being measured are the number of self-identifying census Jews (rather than Jew defined in any other way). It is worth noting that of those individuals identified as Jews in the ONS Longitudinal Study (an approximate 1% sample of the country's population whose census returns are anonymously linked), 9.2% of those who had ticked 'Jewish' in 2001 failed to answer the religion question in 2011, and 9.4% who had identified as 'Jewish' in 2011 had not responded to the question in 2001 (Simpson, Jivraj, and Warren, 2014, Table 7). The similarity of these figures confirms a consistency between the 2001 and 2011 census outputs and therefore the stability of the projection.

The implication of the methodology is that any behaviours or attitudes that held between 2001 and 2011 are assumed to remain unchanged during the projection

period (save for the fertility and mortality assumptions set out in the text). For example, no account has been taken for any future changes in levels of out-marriage or other assimilation. Crockett and Voas (2006) identify an inter-generational decline in affiliation to religion (in general). In parallel, there is some evidence of some Jews considering themselves as Jewish by ethnicity, rather than by religion (Graham and Waterman, 2005; Webber, 1997) – though this does not necessarily impact on self-identification as Jewish on census returns. Schmool (2003) presented some analysis of the degree of Jewish inter-marriage and inter-generational difference in attitudes to exogamous partnerships. Graham (2016), taking advantage of the release of commissioned tables from the 2011 census, has been able to investigate trends in Jewish inter-marriage in more detail. He confirms a material increase in the level of inter-marriage between the 1960s and 1990s (from other data sources), but a virtually stable position more recently – a small increase in the proportion of married couples in exogamous relationships between 2001 and 2011, offset by a larger decrease in exogamy in the smaller number of cohabiting couples. This suggests that a plateau level has been reached, making an adjustment to the projections to address an inter-marriage issue unnecessary.

Finally, although the assessment carried out focuses on the pattern of change in the Jewish population, that group forms a small minority within the wider England and Wales society, and is not isolated from it. Implicit in the approach adopted to produce the population projection is that the influence that actions of others have on the behaviour of Jewish residents between 2001 and 2011 will continue to exert the same influence in the subsequent 20 year period.

All this having been said, the overall direction of the figures produced in the projection are sufficiently robust for a general trajectory to be determined, even if the figures presented are just one set within what could be a widening range the further into the future is being considered. The undoubted major growth in the strictly orthodox population, and shrinkage of major parts of the mainstream Jewish population could well have far reaching impacts on the future balance of the Anglo-Jewish population. Gidley and Kahn-Harris (2010, p166) state that there are ‘demographic trends that present a serious challenge to the British Jewish

community. One is the rapid growth of the British haredi[29] community as an increasingly significant proportion of British Jewry'. The social impacts of this, both within the Jewish community, how it is organised and behaves, and how it is perceived by others are considered by those authors at some considerable length.

This is not the first projection of the future size of Anglo-Jewry to be presented. DellaPergola, Rebhun, and Tolts (2000) undertook a major study, examining the likely prospects for the size of world Jewry up to the year 2080. Their estimates for the UK as a whole (see Figure 9.7) were 272,000 for the year 2000, 253,000 for the year 2010, 221,000 for 2030 (and 137,000 for 2080). The estimate was based on their assessment of migration rates from the 1990s and a 'medium fertility' projection. It was part of a worldwide study (of which the UK was a minor element), and predated the publication of the UK 2001 census, and a full understanding of the scale of population growth among strictly orthodox Jews (whose size prior to the end of the twentieth century had not had a marked impact on the overall size and growth rate of Anglo-Jewry). The projection set out in the current paper is based on much more detailed and verifiable information than was available to DellaPergola and colleagues; it also confirms the importance of breaking down the population into groups with similar characteristics, rather than considering the population as homogenous.

So, what can be concluded from this research? Firstly, a retrospective application of a geodemographic classification built from a new census onto data from an earlier census is possible. Secondly, this allows easy-to-comprehend spatially-based changes in a population to be analysed. Thirdly, quantified trends for different elements of a population can be established, allowing population projections to be made, differentiated by the underlying characteristics of the group (rather than their being based on treating the group as a homogenous entity). The approach therefore allows projections to be made for sub-populations for whom traditional methods cannot be used because of lack of, for example, age-related survival rates. In the case of Anglo-Jewry, the analysis has shown that the balance between the various geodemographic classes and their underlying fertility, migratory

[29] Haredi Judaism is a strand of Orthodox Judaism that adheres strictly to the traditional form of Jewish law and rejects modern secular culture.

and mortality differences points to a level of growth in the strictly orthodox community that will change the overall balance of Anglo-Jewry over the next decades. This will reverse a fifty-year decline, and have significant societal impacts.

This analysis thus has wide-ranging policy implications for the Anglo-Jewish community and the various organisations and bodies that are interested in, and provide services for, that community nationally and in a variety of localities, both Jewish charitable organisations and local government bodies. For example, the projected growth in the number of children, particularly as this growth is focused in three or four particular areas, will require action to ensure that educational provision can be properly planned. At the other end of the spectrum, an increase in the number of elderly people will have implications (generally in other parts of the country) for the provision of social care and cemetery provision. Equally importantly, the relative and absolute reduction (certainly in the medium term) in the number of Jewish residents in the 45 to 74 age range will require a re-think in the way that voluntary bodies in the Jewish community are organised, led, and funded. It is only recently that the strictly-orthodox section of the Anglo-Jewish community has started to have a material impact on the size of the population. A number of other countries are also home to small orthodox populations within a wider Jewish group. The analysis presented here may thus have policy implications for other Jewish communities in other parts of the world.

Historically, fresh data (a new census) have led to old classification systems being discarded, and the building of new classifications 'to better reflect the demographic, social and economic patterns of the time' (Harris, Sleight, and Webber, 2005, p73), and the opportunity to allow geodemographic analysis to quantify the changes that have occurred in an easily understood format has been lost. This work has demonstrated that geodemographic assessment has the capability to be used to quantify change over time. This principle, although demonstrated through consideration of a small sub-population, has the potential to be applied to other groups and to populations at large, and thus give rise to policy issues more widely.

10. Concluding chapter

10.1 Reprise of themes and aims

The principal focus of the research reported in this thesis has been the population geography of the Jews of England and Wales in the first decade of the twenty-first century. Key themes have been: the extent to which there is heterogeneity in the demographic and socio-economic characteristics of Anglo-Jewry within and between different parts of England and Wales; and the spatial distribution of the group and how this is changing over time. There has been a particular emphasis on the role of, drivers behind, and resulting patterns of internal migration. An important element of the approach adopted in the research has been a comparative consideration of Jews with other religion or ethnic-group based cultural groups that (as recorded in the outputs of the 2001 or 2011 England and Wales censuses) also constitute around 0.5% of the total population.

At one level, the basic aims of the research have been exploratory:

- to understand the spatial distribution of Jews in England and Wales;
- to identify whether there are distinct demographic or socio-economic differences between Jewish groupings in different parts of the country;
- to identify whether the characteristics and distribution of these groups is changing over time through migration and natural change; and
- to examine whether the pattern for Jews is similar to those for other small minority groups.

However, much of the approach has sought to understand the 'how' and 'why' of the population geography of Anglo-Jewry to enable the various threads of the research to be pulled together to address the most important and final aim of the research: to theorise what the identified patterns mean for the demographic, spatial, and societal future of Jews in England and Wales over the next decades.

Given that the spatial distribution of Jews and other small minority groups are relatively understudied compared with some of the larger ethnic-group based sub-populations, this, of itself, provides adequate justification for the research presented here. However, there are wider benefits to the carrying out of this work. First of all, the analysis carried out and the population projections produced provide a more objective platform for Jewish communal/voluntary bodies nationally and in various

communities across England and Wales. Secondly, Jews have been present in Britain in material numbers for a considerably longer period than other cultural minorities (of both a similar and also much larger size); therefore the examination of Anglo-Jewry as set out in this thesis provides useful insights into future spatial and socio-economic trajectories for more-recently arrived groups. As a consequence of this, a third benefit of this work is its contribution as part of the wider body of research in providing public and other authorities with responsibilities for combating disadvantage and improving social cohesion with an improved foundation for the formulation of policy.

The next sections of this final chapter demonstrate that the research aims have been addressed and describe the innovative elements and the key contributions of this thesis in the field of population research. These are followed by sections that examine the scope for further work and the policy implications of the study.

10.2 Addressing the research aims

The technical work undertaken to address the aims of the thesis has been described in detail in Chapters 5 to 9. The results of this work have also been set out in those chapters, and summarised in their discussion and conclusions sections. However, it is important that the findings are presented in the overall context of the thesis and its overarching aims, rather than only within the confines of targeted journal articles. In this section, therefore, the findings of the analysis are summarised in relation to the thesis aims, irrespective of where within the technical work they arose.

Are there distinct differences between Jewish groupings in different parts of England and Wales?

The extent of heterogeneity amongst Anglo-Jewry has been investigated in two parts of the thesis. The geodemographic assessment set out in Chapter 5 had this matter as its focus, but heterogeneity has also been investigated as an explanation for different patterns of spatial distribution change in Chapter 6. The presence of strictly orthodox groups with distinct characteristics compared with 'mainstream' Anglo-Jewry has been known for some time. However, the findings of the geodemographic assessment clearly set out that not only are there distinctly different groupings within the mainstream, and that there is a strong spatial element

to where these different groups are found, but there is also a degree of heterogeneity within the strictly orthodox community too. The names allocated to each of the seven classes identified highlight their key characteristics and the features that distinguish them from other classes. Groupings of each class are, for the most part, found in a number of localities across the country, however, there is a strong consistency to the type of area where they are found. Thus, there are two classes that are found in inner areas of larger towns and metropolitan areas: 'footloose cosmopolitan professionals' and 'blue collar and student urbanites'. Two classes are found in compact non-central areas: 'very young deprived traditionalists' and 'young fairly comfortable conservatives' – these classes represent the strictly orthodox enclaves. Finally there are three classes found in suburban, semi-rural, and coastal towns: 'comfortable educated suburbanites', 'affluent home-grown commuters', and 'comfortable home grown elders'.

In summary, therefore, the simple answer to the research question is 'yes' – there are distinct differences between Jewish groupings in different parts of England and Wales. However, it is important to recognise that both the range of difference between groups, and the scale of geographic clustering of similar groups, are extensive. Closer examination has shown that each of these classes has a distinct age profile with only limited similarity between one or two classes, and the analysis has shown that this is reflected in large differences in natural change in their populations with consequent impacts on their size change and spatial distribution over time. Migration patterns are influenced by the differing age and socio-economic mixes of each class. Most previous studies have explicitly or implicitly assumed homogeneity in 'mainstream' Anglo-Jewry. Identifying that these different groupings exist is thus an important step forward in developing an improved understanding of the current and future needs of different Jewish communities in different parts of the country, and in considering their likely future demographic profiles.

What do we now know about the spatial distribution of Anglo-Jewry?

The spatial distribution of Anglo-Jewry has been addressed at two points in the thesis technical work. Chapter 6 provided a higher level overview of the distribution of the Jewish residents of England and Wales in 2011, in the context of comparing the distribution of Jews with that of other similar size groups. It reported

a marked similarity in the pattern of distribution and hierarchy of settlements for Jews and two other groups – one large, moderately dense grouping in the London area, home to the majority of the group members; one or two more moderately sized groupings elsewhere in the London area; one or two significant communities outside of London (the North Manchester area in the case of Jews), and a scattering of smaller clusters in other major urban areas. More specifically, Chapter 6 noted a Jewish focus in outer suburban areas and the small town/partly-rural hinterland beyond the suburban limit, with no material presence in the original settlement areas of, for example, the 'east end' of London. As has already been established through previous studies in the UK and USA, the level of congregation is exceptionally high compared with that which traditional theory might anticipate for a long-established group.

The geodemographic assessment developed in Chapter 5 (and extended in Chapter 9) necessitated the identification of a hybrid geography to allow the technique to be applied to Jewish residents of England and Wales. This provided a more detailed examination of the distribution of Anglo-Jewry. As part of that process, accumulations each including at least 200 Jewish residents were identified and, based on the results of the geodemographic assessment, the largest were broken down into distinct communities (see Table 5.9). In addition, the process had also identified (though not reported in the published paper) further areas that, in 2011, were each the home to between 75 and 200 Jews. The wide variation in the density of Jewish presence (Jewish residents as a proportion of total area population), even within the identified accumulations, was demonstrated through an examination of the analysis areas into which the accumulations had been divided for the geodemographic assessment. As reported in Table 9.2, in the analysis areas that consisted of a single LSOA, Jews made up on average 37% of the population; in single MSOA analysis areas they constituted 9% of the population; and in the multiple MSOA areas, just 0.5%.

Data on all the identified areas are brought together in Table 10.1, to provide a summary of the spatial distribution of Anglo-Jewry. The table is useful in that it presents information about the disposition of Anglo-Jewry in a more informative manner than simple population numbers based on local authority boundaries. It links population and areal density, population change with geodemographic class, and

Table 10.1 Summary of Jewish accumulations/communities (2011 data)
(on two pages)

Accumulation or Community (by Region)	Size (2011 MSOAs)	Jewish Residents	Jews per 1000 Usual Residents		Jews per 100 Ha		Student Proportion	2001 to 2011 Jewish population change **		Geodemographic Class***
			Number	*Rank*	Number	*Rank*	(if >15%)	Change	*Rank*	
Newcastle	23	660	3	*39*	3	*46*		-24%	*46*	more G than B
Gateshead	14	2940	28	*10*	68	*13*	34%	+83%	*1*	C
Prestwich, Whitefield and Bury	27.4	7830	40	*9*	72	*12*		-2%	*22*	G with some F
Broughton Park area	3.6	10200	330	*2*	1767	*3*		+56%	*3*	Balance of C & D
Manchester and Salford Central	94	2850	4	*33*	11	*24*	20%	0%	*17*	B
Trafford South, Stockport and E Ches	39	3750	13	*15*	7	*31*		-2%	*21*	F
Liverpool	30	2020	9	*19*	35	*16*		-24%	*45*	G with some B & F
Southport	12	350	4	*31*	6	*36*		-39%	*53*	G
Blackpool & St Annes	27	570	3	*41*	8	*28*		-21%	*41*	G
Leeds	73	6850	13	*14*	14	*22*		-16%	*37*	G with some B & F
Hull	17	240	2	*52*	3	*44*		-46%	*54*	G
Sheffield	22	540	3	*38*	6	*37*	26%	-23%	*44*	B
Nottingham	39	1370	4	*28*	7	*33*	54%	-13%	*31*	B with some G
Leicester	11	300	3	*40*	13	*23*	17%	-34%	*51*	G
Birmingham & Solihull	54	1870	4	*29*	14	*21*	38%	-26%	*49*	Balance of G & B
Warwick	8	210	3	*43*	2	*48*	31%	40%	*5*	B
Norwich	16	260	2	*53*	5	*41*	21%	-1%	*18*	B
Cambridge	25	1110	5	*26*	3	*47*	31%	+13%	*10*	Balance of A & E
Luton	21	330	2	*54*	8	*30*		-38%	*52*	G
St Albans and N Herts	56	1690	4	*30*	3	*45*		+16%	*9*	E with some B
W Herts and E Bucks	88	4460	7	*21*	5	*42*		+2%	*15*	F
Hertsmere, Hatfield, & London Colney	23	15600	90	*7*	75	*11*		+35%	*6*	F with some E
Epping Forest, W Essex and E Herts	75	5490	9	*18*	3	*43*		+12%	*11*	F
Southend	42	2670	7	*20*	10	*26*		-19%	*40*	G
Inner East and NE London	101	4840	6	*24*	49	*15*		-22%	*43*	B
Stamford Hill	7	15900	283	*3*	3809	*1*		+69%	*2*	C
Central and Inner North London	87	16800	23	*12*	273	*7*		-1%	*19*	A
Inner West London	124	12100	12	*16*	90	*10*		-11%	*30*	A
Inner South London	145	4350	4	*32*	32	*17*		-3%	*24*	A

Accumulation or Community	Size (2011 MSOAs)	Jewish Residents	Jews per 1000 Usual Residents		Jews per 100 Ha		Student Proportion	2001 to 2011 Jewish population change **		Geodemographic Class ***
			Number	*Rank*	Number	*Rank*	(if >15%)	Change	*Rank*	
Redbridge, Havering and Chingford	89	12200	16	*13*	58	*14*		-28%	*50*	G
Enfield Town and Broxbourne	35	3230	12	*17*	30	*18*		-14%	*32*	G with some F
East and High Barnet, and Cockfosters	10	4740	60	*8*	182	*8*		-6%	*27*	F with some E & G
Hampstead, E Finchley and Muswell Hl	20.7	16000	105	*6*	580	*5*		+8%	*14*	E
Golders Green & Hendon South	3	13000	442	*1*	3477	*2*		+41%	*4*	D
Hendon North and Finchley	12.3	14000	125	*5*	713	*4*		+16%	*8*	E with some G
Edgware, Mill Hill, and Totteridge	7	13000	215	*4*	426	*6*		+11%	*12*	F with some D
Harrow, Hillingdon and Wembley	73	14300	24	*11*	92	*9*		-26%	*48*	More G than F
SW London	59	2870	6	*23*	25	*19*		-15%	*36*	E
Sutton & Epsom	51	1030	3	*44*	6	*38*		-15%	*35*	More G then F
Croydon and Streatham	65	1230	2	*47*	6	*35*		-24%	*47*	B
Bromley	42	1000	3	*37*	10	*25*		-14%	*33*	More E than G
Milton Keynes	26	420	2	*50*	2	*52*		-2%	*20*	B
Oxford	25	1190	6	*25*	8	*27*	35%	+2%	*16*	A with some E
Reading & Maidenhead	90	1870	3	*42*	2	*51*		-9%	*28*	E with some G
Worthing	19	340	2	*48*	6	*34*		-2%	*23*	G
Brighton	64	3380	7	*22*	5	*40*		-16%	*38*	More G than B
Eastbourne	19	330	2	*49*	1	*53*		-6%	*25*	G
Central and West Surrey	105	2460	3	*36*	2	*49*		-6%	*26*	E
Sevenoaks & Borough Green	10	210	2	*45*	1	*54*		+16%	*7*	E
Canterbury & Whitstable	12	200	2	*51*	2	*50*	27%	+10%	*13*	B
Thanet	12	220	2	*46*	7	*32*		-21%	*42*	G
Bournemouth	52	2010	5	*27*	5	*39*		-15%	*34*	G
Bristol	23	610	3	*35*	18	*20*	34%	-10%	*29*	B
Cardiff	28	710	3	*34*	8	*29*		-17%	*39*	More B than F
All >200 population accumulations	2256	238600	13		19			+1%		
All 75 to 200 pop accumulations*	142	2460	2		2		18%	+4%		
Rest of England and Wales	4803	24000	0.7		0.2			-2%		
England and Wales Total	7201	265100	5		2			+1%		

* includes (showing geodemographic class and high student proportion): Durham (B, 73%), York (B, 35%), Northampton (B), Sutton Coldfield (B), Coventry (B, 54%), Thurrock (F), Chelmsford (G), Colchester (B), Maldon (F), Clacton & Frinton (G), Cherwell (E), Southampton (B, 38%), Portsmouth (G, 28%), East Grinstead (E), Hastings & Bexhill (B), Tunbridge Wells (E), Exeter (B, 37%), Plymouth (B, 21%), Bath (A, 29%), Swansea (B, 35%)

** excludes students *** see Chapter 5 for a description of the classes

indicates which communities have a strong student focus. It thus underpins and also reflects the analysis presented in various parts of the thesis in connection with the other research aims.

What has been established regarding change over time and the role of internal migration and natural change?

Internal migration is an important contributor to change in spatial distribution over time. The analysis carried out in Chapter 7 indicated that the principal socio-economic characteristics that determine the propensity to migrate (age, particularly age of HRP, housing tenure, and family mix/presence of dependent children) are the same for Jews as for the population as a whole. Whilst the raw data suggested a slightly higher propensity to migrate (between 2010 and 2011) for Jewish residents compared with white British residents, once variation in the composition of the groups was controlled for, the difference completely disappeared. Indeed, the small initial difference arose partly through the Jewish group including a higher proportion of degree holders than the white British group, only partly offset by a higher proportion of persons living in married couple households. However, for certain characteristics the Jewish group exhibited a different behaviour: a reduced level of migratory activity in Jewish households with an HRP aged 50 or more, and a low increase in migration propensity of individuals living in private rented accommodation. Although the overall level of migration (having controlled for variation in characteristics) was similar for Jews and white Britons, Jews have a higher propensity to make moves of less than 20km and a reduced propensity for longer moves than the host group.

Indeed, this dampening of longer distance moves is reflected in the analysis presented in Chapter 8, which showed that, of the groups assessed, Jews demonstrated the largest frictional impact of distance on the pattern of inter-community moves in 2010-11. Looking at the pattern of movement more generally, a major difference between the move patterns for students and non-students has been identified. About 25% of London-based Jewish students chose to move to each of SE & England and the rest of England and Wales, compared with far fewer than 10% of non-students. Jewish degree holders living outside of London are considerably more likely than non-degree holders to make a move to London. These findings are mirrored in the conclusions reached as regards migratory patterns previously found

for the population at large. Outflows from London are reflected in the overall counter-urbanisation analysis that showed a net outward movement of Jewish residents as far as two rings of local authorities beyond the Greater London boundary. The examination of longer term data using the ONS Longitudinal Study showed that the counter-urbanisation pattern prior to 2001 was much stronger. Examining moves more generally, for 2010-11, the Jewish group demonstrated relatively high levels of net regional migration effectiveness – sufficient, if persistent, to have a noticeable long term impact on the regional distribution of the group. Indeed, examination of the longer term data showed that regional migration effectiveness had been higher in the past, so the current redistribution impact, whilst still material, is at a lower level than has historically been the case.

When the regions were grouped to assess whether the Jewish group demonstrated a measurable overall north-south population drift for 2010-11, the movement constituted an annual loss of 0.5% of the group's population in the area outside of London and South East and East England. However, there have been fluctuations in the degree and direction of population drift over the longer term period.

Internal migration is not the only contributor to spatial distribution change, nor is spatial distribution change the only type of change over time that has been examined. In preparation for developing population projections, the research set out in Chapter 9 sheds light on two other types of change; one is population spatial re-distribution due to natural change (the balance between births and deaths), and the other is a change in the characteristics of a population living in a particular area. The application of the 2011 geodemographic classification to 2001 census data identified that there was a spatial element to the limited extent of changes in analysis area classification that had taken place, with adjacent areas demonstrating similar changes. Three strong trends were reported: an expansion of Class G (comfortable home-grown elders) into areas that were previously Class F (affluent home-grown commuters) in NW and NE London and larger provincial communities, largely driven by suburbanisation disproportionately applying to younger adults; an increase in the attractiveness of some universities leading to an expansion of areas allocated to Class B (blue collar and student urbanites) in provincial cities; and a reclassifying of some east London Class B areas as Class A (footloose cosmopolitan professionals)

or Class E (comfortable educated suburbanites) reflecting increasing socio-economic status or perhaps some gentrification of areas.

Subdividing the Jewish population by geodemographic class exposed large differences in the impact of natural change. For the orthodox enclaves classes (C, very young deprived traditionalists, and D, young fairly comfortable conservatives) births were found to add (over the 2001 to 2011 period) between one third and over a half of the 2001 population. The birth contribution was typically around 10% for other classes, though as low as 5% for Class G (and, as an extreme example, just 1% in Hull). With their overall young age profiles, deaths had the smallest impact in Class C and D areas (a loss equivalent to 6% of the 2001 population, but as low as 3% in Gateshead), rising to 18% in Class G areas (including 32% in Hull).

In summary, natural change was found to make a larger contribution than inter-class area migration to the overall growth of Class C, D, and at a much smaller scale, Class E areas, and the larger contribution to the overall shrinkage found in Class B and particularly Class G areas.

Does the population geography and migratory behaviour of Jews differ from that of other small cultural groups?

The investigation of the historic size of various small groups, as set out in Chapter 6, showed that Jews have been present in material numbers in England and Wales for a number of generations longer than other groups of comparable size (and indeed most other minority groups). We might therefore expect to find that Jews have a distinctively different population geography to other groups. The chapter also indicated that the overall age profile for Jews is more older-age biased than the Bangladeshi, Chinese, and Sikh groups considered but there are, for example, similarities between Jewish and Chinese deprivation profiles and out-marriage levels.

However, there is a broad similarity in the overall hierarchy of communities for the Bangladeshi, Jewish and Sikh groups, as already noted in the section on spatial distribution of Anglo-Jewry (p235). The longevity of presence has not resulted in marked differences in the level of congregation for these three groups, but is reflected in the degree of movement away from original settlement areas. Nevertheless, the Jewish, Bangladeshi and Sikh groups share a pattern of suburbanisation/counter-urbanisation over the 2001-11 period, and the pattern for all

three groups embodies a tension between suburbanisation/counter-urbanisation and a desire for group congregation.

The findings for the Chinese group show that its distribution is quite different to all the other groups investigated. It must be recognised that international students make up a significant part of the 2011 Chinese community in Britain, and the proportion of students has increased greatly over the 2001-2011 period, overwhelming spatial distribution changes for the permanent population. However, both the Jewish and Chinese groups demonstrate an increased presence in 2011 in the LSOAs where they were most populous in 2001.

Migratory behaviour is a key driver of change in spatial distribution for most small groups. Insofar as the levels of internal migration taking place between 2010 and 2011 are concerned, the analysis described in Chapter 7 identified that there is a difference in migration propensity between Jews and the other groups examined. The overall migration level for Jews is not materially different to that found in the dominant white British group. However, the Arab, Chinese, and Sikh groups display a 5% reduced level, which can be regarded as a cultural group factor or penalty, even after differences in age profile, housing tenure, and differences in the overall levels of unemployment and deprivation in the regions in which the groups are distributed are accounted for. Though the penalty appears small, it applies per annum, and would affect the number of moves made by members of the three groups over a lifetime. The penalty may arise from the positive attraction of living in the vicinity of other group members and culturally relevant facilities, and some discriminatory elements.

As regards moves of members of smaller groups between the group's communities, all the groups examined in Chapter 8 (Arabs, Chinese, Jews, and Sikhs) exhibited a greater reluctance to make a longer distance move in 2010-11 than the white British by a significant margin. However, the spatial interaction models used to assess the issue showed only mostly non-significant differences between the behaviours of the small groups.

The examination of patterns such as counter-urbanisation and movement between population density quintiles found that overall migration patterns for Jews are quite closely paralleled by the Sikh group, whereas two of the small groups considered here – Arabs and Chinese – demonstrate patterns of movement that are

materially different. Whilst this conclusion applies to analyses of the 2010-11 migration patterns, analysis of longer term patterns using data from the ONS LS leads to broadly the same conclusions (noting that no assessment of Arab migration could be explored for these periods due to the small sample size).

Insofar as the research question is concerned, therefore, to some degree the longevity of the Jewish group is associated with differences in spatial distribution and migration patterns compared with other groups, most notably in the absence of a material presence in original settlement areas and in the absence of group penalty affecting migration propensity. Similarities between the Jewish and certain other groups may be associated with a shared desire for a level of group congregation. There are thus some areas in which the Jewish group's experiences provide 'pointers' to the future pattern of other small immigrant-based groups.

What do the findings allow us to say about the demographic future of Anglo-Jewry?

The most important aim of this thesis has been to say something about the demographic future of the Jewish population of England and Wales. Much of the research described has focused on spatial distribution of Anglo-Jewry and the changes in that distribution brought about by migration and natural change over various time frames leading up to the 2011 census. Not only have quantitative changes been identified and described, but the approach has sought to provide an understanding or explanation of those changes, taking account of the socio-economic heterogeneity of the group. These strands were brought together in the second half of Chapter 9, which presented a population projection for Anglo-Jewry, subdivided by geodemographic class to maximise the benefits of the analysis presented in the first part of that chapter, and in recognition of the more accurate projection that could be so constructed.

The basic approach adopted was one of projecting forward trends established for the 2001-11 period, effectively assuming that external factors that had influenced or determined those trends would remain in force and have the same influence over the ensuing period. A number of areas were investigated to demonstrate that these assumptions were justified and future fertility and mortality levels were reviewed to examine the sensitivity of the projection to reasonable changes from the established trends.

The projection indicates that the 2011 census-based Jewish population of 265,000 would reach 275,000 to 281,000 by 2021 and 292,000 to 306,000 by 2031, noting that the ranges merely give an indication of the sensitivity of the projection to the fertility and mortality assumptions, rather than representing a range limit or confidence interval. The overall result would reverse the pattern of steady contraction observed during the second half of the twentieth century, and reflects the growing impact of high fertility levels (and young age profile) in the strictly orthodox sections of the community. The projection anticipates that those sections will grow from 15% of Anglo-Jewry in 2011 to about 30% by 2031; conversely, the comfortable home-grown elders (Class G) areas are projected to lose 40% of their 2011 population by 2031.

The identification of the reversal in overall population trend and quantification of the scale of change have only been possible because of the approach adopted – breaking down the projection by sub-group of the population – which itself has only been made possible through the development of the geodemographic assessment of Anglo-Jewry

The conclusion of this analysis is that the combination of large growth in the strictly orthodox sector and material contraction of parts of the mainstream will have far-reaching consequences for the mix and demographic profile of community types across Anglo-Jewry, with an increasing proportion to be found in the London area, and all provincial communities, except the Manchester area and Gateshead, reducing in size. The impact of these changes in policy terms are considered later in this chapter.

10.3 Innovation and key academic contribution of the thesis

The focus of the thesis – the population geography of Anglo-Jewry – is a much understudied area, so one of the main contributions of this research is to illuminate this topic. Furthermore, much of the work is presented in the form of a comparison with other sub-populations. For some of these groups, notably Arabs and Sikhs, very little analysis has previously been presented, and for others, such as the Chinese group, the major expansion in population over the last decade, particularly as regards international students, warrants a revisiting of that group. Even where techniques are not new, the thesis extends approaches used to study ethnic groups into a second element of cultural identity – religion.

The work described in Chapter 5 includes a number of methodological innovations that allow geodemographic analysis to be applied to unevenly distributed minority sub-populations, overcoming two particular issues: finding a suitable geographic base to ensure data reliability; and developing a methodology to avoid known weaknesses in certain clustering techniques, specifically distortion caused by outlier cases and generation of sub-optimal local minimum solutions. The first matter was overcome through the use of a hybrid geographic base – in which analysis areas based on two different levels (LSOAs and MSOAs) were combined, and large parts of the study area omitted completely. The second weakness was addressed through the technique of temporarily excluding outlier cases, and avoiding the use of the *k*-means algorithm with a random starting point.

The geodemographic assessment presented in that chapter is the first to examine solely the Jewish (or indeed any sub-group) population. It identifies distinct socio-economic and demographic differences between Jewish groups in different areas, not fully attributable to the underlying social geography of the population at large. It establishes a methodological approach that could be used for other uneven sub-populations and in other localities.

The analysis presented in the first part of Chapter 6 provides an important message for those interpreting reports that make use of indices of distribution, particularly *D*, the Index of Dissimilarity. It has, of course, long been known that geographic scale has an impact on values of *D* – smaller areas tend to be more homogenous, and therefore produce increased values compared with studies using larger geographic units. However as few studies routinely present results at a range of scales, there has been limited opportunity to examine whether the issue of scale is sufficient to impact on the overall conclusions of the analysis. The results presented in Chapter 6 are innovative in that they demonstrate that quite different conclusions would indeed be reached had results been presented at a different scale. In the case of this study, headline conclusions about Chinese and Jewish increasing unevenness and level of unevenness differ at different scales.

Two particular findings from the more detailed analysis of change in spatial distribution included later in Chapter 6 warrant restating here, as they contribute to the understanding of group dispersal. The first is that even though the phenomenon of a desire for group congregation apparently inhibiting the trajectory of group

dispersal has been found for ethnic groups, the main influence encouraging congregation may be religion – based on the findings for Jewish, Sikh, and Bangladeshi residents on one hand, and the Chinese group on the other. The second is that the link between intermarriage levels (which vary greatly between Jews, Sikhs, and Bangladeshis) and level of dispersal (which does not) is weak.

The overall message of this part of the research is that a full understanding of the complexity of minority group spatial distribution trajectory necessitates investigation at a fine geographic level taking proper account of the heterogeneity of personal, household, and community characteristics.

The most important wider contribution of Chapter 7 is not connected with the specific groups whose migration practices are under investigation. Census data have been used extensively in studies of internal migration even though the socio-economic characteristics they can provide relate to the post-move situation, whereas the need to move and/or the decision to move in most cases will have been brought about by the circumstances pertaining before the move. Previous studies have not addressed this potential mis-association. However, through an examination of data from the Labour Force Survey, this study has demonstrated that there is no significant difference in migration propensity when measured against pre- or post-move economic/employment characteristics and effectively legitimated the use of (post-event) census characteristics in migration studies.

As regards the methodology used to analyse the determinants of small group migration, the approach adopted has been innovative in that, unlike previous work in this field, it has included the whole age range of the population (rather than only adults), and incorporated individuals living in communal establishments (rather than just those in private households).

The analysis extends knowledge in this area through establishing that, having controlled for individual characteristics and regional context, there remains a residual suppression of migration activity, a 'cultural group penalty', for some groups but not for Jews. This suggests that longevity of presence leads to a reduction in or disappearance of penalties, with the passage of time and changes in cultural habits of majority and minority groups leading to changes in inter-group attitudes and migration patterns.

Though the utility of spatial interaction (gravity) type models for the study of movements is widely known, there are very few examples of the use of an unconstrained model to explain the relationship between the level of moves and the characteristics of movers (as opposed to fully constrained models that can be used to precisely summarise a matrix of inter-zonal flows). The development of such models in this study significantly adds to the small number of studies that have focused on quantifying the deterrence effect; and the research reported in Chapter 8 is believed to be the first to investigate how geographical separation between communities influences the propensity to move between them.

The conclusion of the later part of the chapter that north-south drift is, for the population at large, currently no longer a matter of any practical concern, also contributes to the broader consideration of internal migration.

Finally, insofar as this element of the research is concerned, the demonstration that the ONS Longitudinal Study can be used to examine migration issues even for small groups is an important finding for longitudinal and long-period research in this field.

The work reported in Chapter 9 presents two innovations. The first is the successful application of a geodemographic classification based on 2011 census data to information extracted from the 2001 census, thus allowing geodemographic assessment to be used to establish trends rather than simply representing a 'snapshot' in time. In addition, the approach adopted has allowed for the potential for there to be temporal changes in the influence of population characteristics.

The second new element is the development of a methodology for generating population projections for sub-populations for whom comprehensive fertility and mortality/survival rates and tables are not available. Furthermore, it has refined the projection process by taking account of heterogeneity of characteristics within the sub-population, and potential future changes in fertility and mortality levels.

The successful demonstration of these techniques in the case of Jewish residents of England and Wales thus paves the way for equivalent analysis for other groups, other time periods, and other locations.

10.4 Case and scope for future work

One of the undoubted strengths of the research presented here is that the primary source of information derives from national censuses – nominally a

complete survey of the whole population, including all Jewish residents. Indeed, ONS goes to great lengths to minimise bias in the presented results through validation surveys and through data imputation. The availability of a suitable second source of national (Jewish) data might allow further dimensions to the range of characteristics to be included, and the findings to be enhanced. There are a number of somewhat dated local area studies of Anglo-Jewry (see section 3.2) but the presence of nationwide survey information is very limited. The only relevant study is the National Jewish Community Survey (NJCS), also described in Section 3.2. That was a nationwide survey carried out in 2013 and 2014, for which 3736 valid questionnaire responses were received. It included some demographic information but focused on a range of attitudinal questions. Coincidentally, the number of responses was almost the same as the number of Jewish individuals included in the ONS Longitudinal Study (that is, just over a 1% sample of the population). However unlike the LS, the NJCS sample is not unbiased. The survey report recognises that strictly orthodox communities were very under-represented, and that there is a significant London bias in the sample as a whole. As a result of this, I decided that it would not be appropriate to incorporate any of the NJCS data into the research presented in this thesis. Nevertheless, an area for future work would be an examination of how non-census characteristics could be incorporated; for example, through further investigation of elements of the NJCS information, or development of ways to supplement or improve that source, or an alternative (new) survey.

Chapter 8 has shown that it is possible to make some use of the ONS Longitudinal Study in investigating patterns of migration in quite small sub-populations, despite the LS including only a 1% sample of the population. Clearly the relatively small number of smaller cultural group members of the LS does place limits on the extent to which the data can be stratified by, for example, age, home tenure, or economic status. However, another area for further work would be to investigate and maximise the use of this important longer period source of data. It might be possible to develop some multi-level models (with categorical repeated measures outcome) to address matters such as changes in decadal move/not-move behaviour over the four LS periods (1971-81, 1981-91, 1991-2001, 2001-11) or changes in the balance of moves between London / SE & E England / Rest of E&W over the 4 periods. Further analysis might then be possible, taking full advantage of

the longitudinal nature of the data to carry out an analysis of the nature and patterns of moves by tracking individuals over 30 or 40 years using a form of discrete-time event history analysis.

For 'whole' populations, changes over time can arise only through natural change (additions by birth, losses through death) and as a result of in- and out-migration. For sub-populations (such as Jews) there is a further mechanism for change – movement into or out of the group. Additionally, such moves can be 'real' or they can arise through administrative reasons – for example, given the voluntary nature of the religion question on the England and Wales censuses, and the potential for individuals to have the form completed by another person in their household. Thus some of the individuals who, for example, ticked the 'Jewish' box in the 2001 census may have been allocated to 'religion not stated' in 2011 without there having been any real change in their sense of affiliation. The other primary source of movement into or out of the group is in the religious affiliation ascribed to children, particularly where the parents do not share a common affiliation. Insofar as the research reported in this thesis is concerned changes in individual affiliation and inter-generational loss of affiliation have not been investigated in detail. That is not to say that they have been ignored. As discussed in section 9.9 there is evidence from the ONS LS of a broadly equal level of 'Jewish' to 'religion not stated' and 'religion not stated' to 'Jewish' changes between the 2001 and 2011 censuses (other changes involving Jewish-once respondents are minimal). Also in section 9.9 evidence of a plateauing in the level of Jewish exogamy and consequential religion of children is reported. Recent additional census output does now, at a national level only, make further research into these areas of gain and loss for (religion-based) subpopulations more practical, so this is an area that could be investigated in more detail in the future.

Finally, the primary thrust of the research reported in this thesis has been about the Jewish population of England and Wales. However, context has been provided by presenting some of the analysis in terms of cross-group comparisons. A possible extension of the work presented here would, therefore, be to undertake the equivalent analysis for one or more of the other groups that have had some focus (particularly Arabs or Sikhs both of whom have received limited attention in other studies) or indeed any other sub-population. Expansion to the whole of Great

Britain (by including Scotland in the assessment) should also be possible, though there are some differences in outputs from the censuses. The religion question, as asked in Northern Ireland, is differently structured thus precluding a true UK-based extension of the study.

10.5 Policy implications

The research described in this thesis has policy implications in three basic areas: within the British Jewish community itself; for other minority/cultural groups that form part of the resident population of the country; and for governmental bodies and other organisations who have an interest in or responsibility for addressing issues of social cohesion and disadvantage. These have been touched on in some of the technical chapters and are drawn together here.

One of the key topics to which the analysis has returned to at a number of points is heterogeneity within groups. Two key messages arise from this: firstly, heterogeneity of personal characteristics both within and between groups is likely to confound attempts to produce high level predictive models of, for example, spatial distribution change, migration, or socio-economic status change. Secondly, however, only by taking proper account of group heterogeneity at a detailed level can population analysts genuinely assist policy makers address issues of segregation, disadvantage, and cultural diversity.

The Jewish group has had a substantial presence in Britain for at least 75 years longer than other groups represented in this thesis, and indeed a number of other larger minority groups. Thus, the second key topic is the extent to which the findings for the Jewish group can provide pointers for the future population geography of other groups and inform policy matters more widely. For example, the absence of a group penalty for Jews as regards propensity for internal migration may, in part, reflect the longevity of the group's presence, with established connections between Jewish communities facilitating a greater degree of interchange between localities. Similarly the greater level of suburbanisation (and beyond) found in the Jewish community compared with the other groups considered could easily be indicating a pathway that other groups will follow. Indeed, the continuing levels of group congregation found in Anglo-Jewry, despite its long presence, may be a better guide than traditional distribution theory for the future level of concentration of other groups, particularly those where a common minority religion is a feature.

Some of the findings are of more immediate import for Anglo-Jewry as a whole, and particularly for a number of the smaller Jewish communities. For example, the association found between those aged under 25 and inter-community moves combined with the greater likelihood of making out-of-super-region moves for graduates raises issues about the future socio-economic and demographic mix (and thus the longer term viability) of smaller groupings in some parts of the country. The changing mix over time will give rise to significant policy issues for the Jewish communal organisations, and bodies in the wider communities in which Jews reside.

More particularly, the headline findings from the population projection work are the expected major increase in the strictly orthodox population, and contraction of significant parts of the mainstream Jewish population. This will have major consequences for the future balance of the Anglo-Jewish population. The projected increase in the number of children is focused in only a few areas necessitating proper planning of education provision and youth facilities. In other localities, there will be pressure on the provision of social care for the elderly and on cemetery provision. A reduction of the proportion of the Jewish population in the 45 to 65 age group will reduce the pool from which leadership and financial support for voluntary bodies in the Jewish community can be found, and thus a need to re-think how that sector is organised and operates. There may be policy implications beyond the UK, for other countries that are also home to currently small orthodox populations within a wider Jewish group. Within the UK, there are likely to be implications for how the wider community perceives Anglo-Jewry, and how Anglo-Jewry interfaces with official bodies.

10.6 Concluding remarks

This chapter has provided an overall summary of the approach undertaken and the subsequent findings of three years of research into the Jewish population of England and Wales. The depth of research has been facilitated by the inclusion of a question on religion in the 2001 and 2011 censuses, so the timing of the project has been ideal for examining, for the first time possible, intercensal changes making use of a very large dataset. Building on an understanding of the history of Jewish settlement in Britain, and (pre-census availability) twentieth century demographic studies of Anglo-Jewry, this thesis has presented research into differing characteristics, spatial distribution, internal migration and natural change that, in

combination, describe the current population geography of Jews in England and Wales. It has also allowed a projection of the future make up of Anglo-Jewry to be developed. The work has benefitted from the historic context of Anglo-Jewry and the contemporary context of the analysis presented for other small cultural groups.

The broad research areas and questions set out at the start of the thesis have all been addressed in a meaningful manner, and the research has enabled conclusions to be reached both on the likely future trajectory of Anglo-Jewry and on areas where the trajectory for other immigrant-based small groups might reflect the route followed by the longer-established Jewish community.

Whilst the future increasing population projection for Anglo-Jewry will contrast with the decline shown over the second half of the twentieth century, this is more to do with the growing relevance of the strictly orthodox section of the community, rather than any major change in influence of the factors that have shaped the community as a whole over the last several decades.

The approach adopted has incorporated a number of innovations, such as a method of applying geodemographic assessment to small unevenly distributed sub-populations, using that technique to determine trends over time, and legitimating the use of census data in migration studies generally. It has broadened knowledge in the field of population geography simply by shining a light on rarely investigated groups.

The work has been shown to have policy implications not only within but beyond the Jewish community. Indeed the scope to extend the work and enhance its impact have been considered. Finally, the reporting of the work in this thesis has hopefully demonstrated that research focused on a sub-group that makes up barely 0.5% of the population can nevertheless provide useful findings and make a significant contribution to the wider canon of population research.

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Appendix A The ethnic group question – background and criticisms

Although the primary focus of the thesis is the Jewish population of England and Wales, comparisons have been made with a number of other groups, some based on ethnic grouping. In Chapter 2 the development and meaning of the question on religion included in the British censuses of 2001 and 2011 have been discussed. As data for certain ethnic groups have also been accessed as part of this study, it is also important to understand the development of questions on ethnic group, included in the censuses from 1991 onwards, and some of the issues surrounding the interpretation and use of those data. These matters are addressed in this appendix.

Sillitoe and White's (1992) paper sets out the background to the case for a question on ethnic background in the census and the somewhat drawn-out period of testing, rejection, further testing and final inclusion of a question in the 1991 census. The driving force behind the desire to include a question was increasing concerns about discrimination, disadvantage, and restricted progress of recent non-white immigrants and their families, and the need to quantify and understand the distribution of minority groups so that government funding could be targeted to address these matters (Sillitoe and White, 1992).

Although the need for information had been understood for some time – a question on parents' country of birth had been included in the 1971 census as a proxy for ethnic group – there was great difficulty in devising a question that avoided simply asking respondents the colour of their skin (with undertones of racism) yet would be intelligible to those completing the census form and also provide useful information. More specifically, 'to be effective an ethnic classification has to be expressed both intelligibly and acceptably to all sections of the population; it has also to furnish the information in the form in which it is needed' (Sillitoe and White, 1992, p143). It was, however, clear from the outset that the purpose of the question was not to illicit information on ethnic origin from all parts of the population but 'to distinguish reliably all people who belong to groups that are susceptible to discrimination because of their ethnicity' (ibid). It is also worth noting that a question on religion was included in one of the tests carried out in 1985 and that 'the response to the subsidiary question on religion confirmed that southern Asians generally approved of a question of this type and that the standard of their answers was usually very good' (op cit, p150).

Sillitoe and White describe how tests carried out in the 1970s ultimately failed to produce an acceptable form of question – to the extent that it was not even possible to retain the 1971 question on birthplace of parent in the 1981 census. Numerous forms of a question were tested. The main source of difficulty was in finding an approach with which the majority of the black population was comfortable, in particular many black people with family origins in the West Indies/Caribbean, particularly those born in the UK, no longer wished to identify themselves with an overseas locality.

Ultimately, a question was included in the 1991 census. Figure A.1 shows an extract from the 1991 England household form (OPCS, 1991), showing the form of the ethnic group question. Note that the Bangladeshi and Chinese categories whose data have been made use of in Chapter 6 and Chapters 6 to 8 respectively of this thesis were identified in 1991.

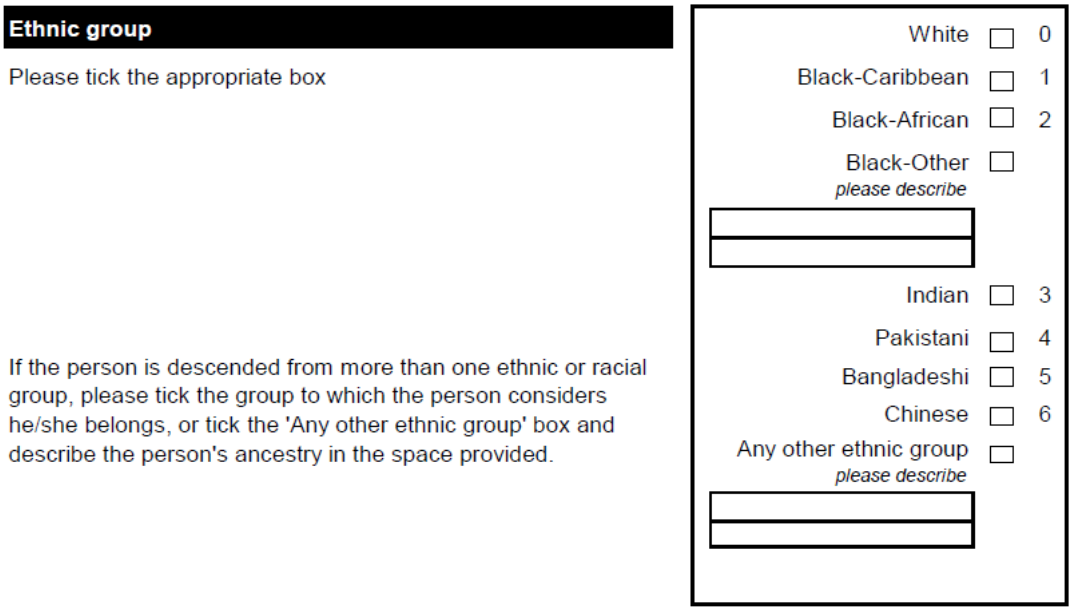
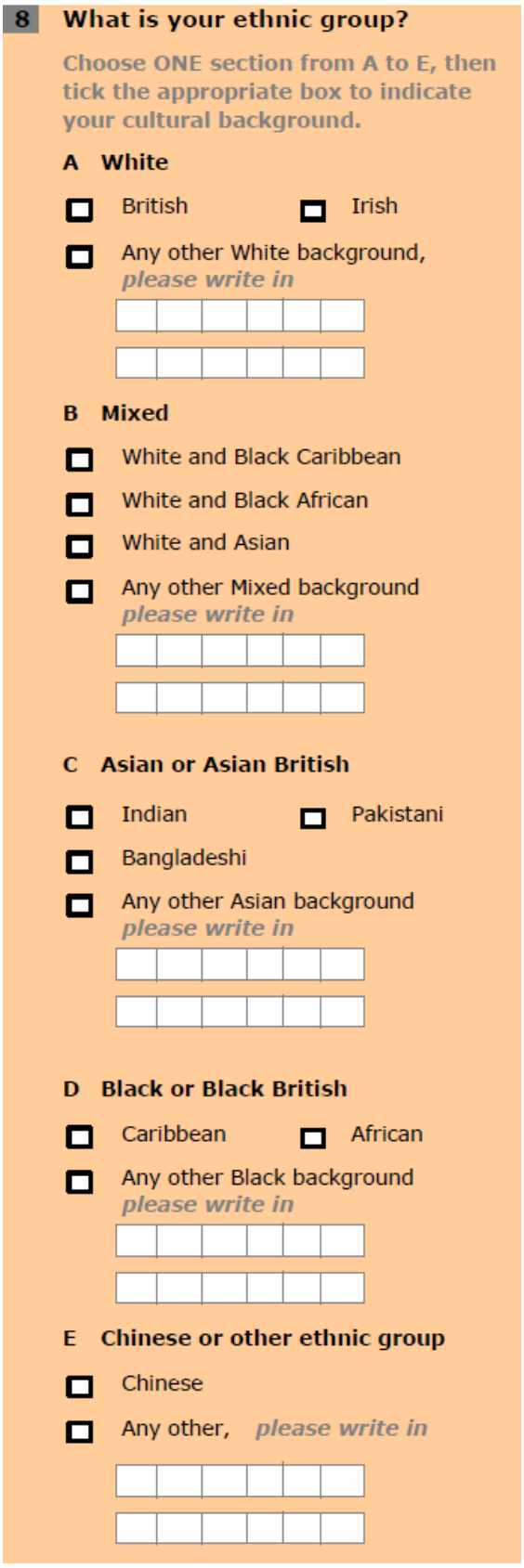


Figure A.1 Extract from 1991 Census England: H form for private households

It is interesting to note that the question is headed 'Ethnic Group' but the guidance also mentions 'racial group' and 'ancestry'. By the 2001 census the question had evolved into the one shown in Figure A.2 (ONS, 2001) with, again, clear Bangladeshi and Chinese pre-selected options. The question now took up virtually the full height of the census form, and introduced a simple split of the white group into British, Irish, and other, introduced a sub-divided mixed/multiple category, and specifically sought to avoid black and Asian respondents, who wished



8 What is your ethnic group?

Choose ONE section from A to E, then tick the appropriate box to indicate your cultural background.

A White

☐ British ☐ Irish

☐ Any other White background, *please write in*

B Mixed

☐ White and Black Caribbean

☐ White and Black African

☐ White and Asian

☐ Any other Mixed background *please write in*

C Asian or Asian British

☐ Indian ☐ Pakistani

☐ Bangladeshi

☐ Any other Asian background *please write in*

D Black or Black British

☐ Caribbean ☐ African

☐ Any other Black background *please write in*

E Chinese or other ethnic group

☐ Chinese

☐ Any other, *please write in*

Figure A.2 Extract from H1: Count me in Census 2001: England household form

to associate themselves with being British, from using that designation as an alternative to selecting an area of family origin. (Note that such consideration was not applied to the Chinese group, listed outside of the 'Asian or Asian British' sub-heading). According to Walls (2001), the inclusion of the Irish category was to allow more detailed examination of health differentials between Irish and British people, rather than more general issues of discrimination or disadvantage as had been the focus of the categories identified in the 1991 census, but see Howard (2006) for a broader discussion on the background to and results of inclusion of a White Irish category. This time, the guidance no longer referred to racial group or ancestry, but used the term 'cultural background'. Aspinall notes that this term is 'unsustainable' (2000b, p113) in the context of offering Indian, Pakistani, or Bangladeshi as options 'in contrast to the subcontinent's distinct ethno-religious groups like 'Punjabi Sikhs' and 'Gujarati Hindus''(ibid).

Further changes to the question were introduced for the 2011 census. Though this resulted in the identification of an Arab ethnic group (data for whom were accessed for Chapters 7 and 8 of this thesis), its positioning as part of a residual 'other' sub-section might have been viewed somewhat negatively in some quarters. The form of question is shown in Figure A.3 with the question guidance simply referring to 'background' (ONS, 2011a).

It is clear that the inclusion of the term 'Black British' in the main group heading has not been wholly successful in encouraging all those who prefer to identify themselves as that to also associate themselves with a locality of family background (Africa, Caribbean, or elsewhere) as over 134,000 residents of England and Wales provided a 'Black British' write-in answer in 2011 (Source: Census Table QS211EW). A very much smaller proportion of respondents chose to identify themselves solely as 'British Asian' without any association with an overseas background.

A similar point regarding the responses of some British Black respondents is made by Ballard (1996) in analysing the output from the 1991 census. Indeed, he is highly critical of the approach adopted by OPCS in developing the form of question finally included in 1991. Ballard considers that the focus was too much on identifying a question that would be consistently answered by the majority of

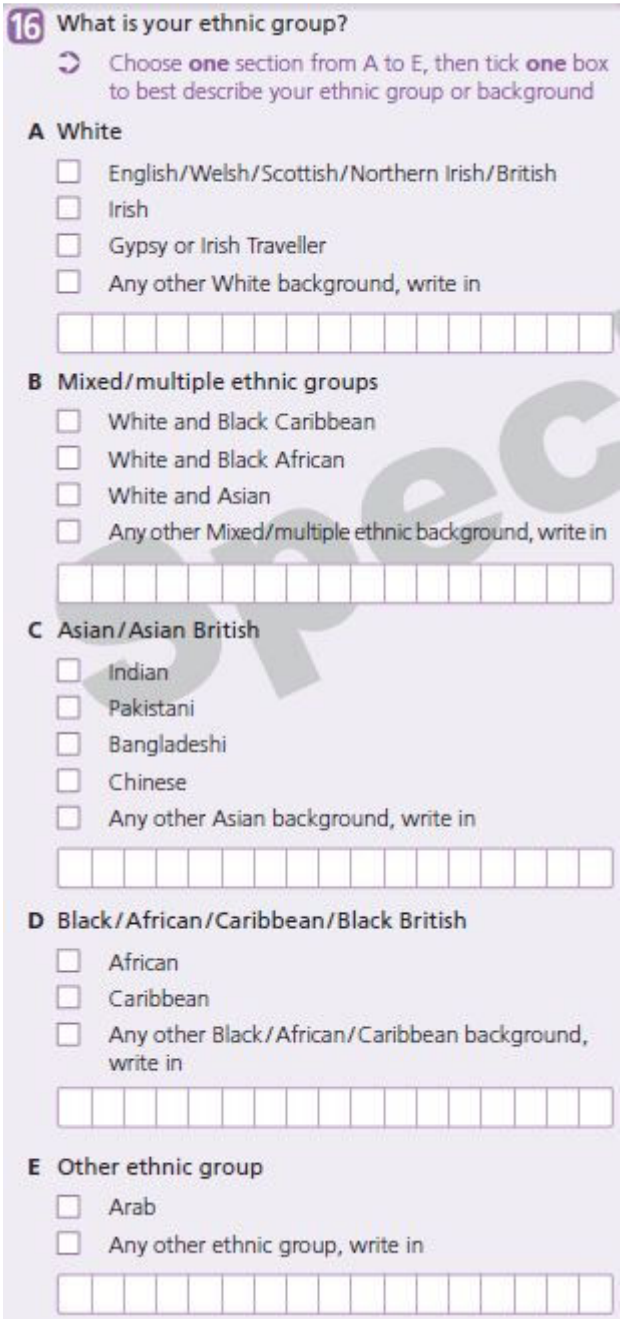


Figure A.3 Extract from 2011 census: household questionnaire: England

respondents, rather than considering in more detail why the question was being asked and what was intended to be identified. These criticism were repeated (Ballard, 1997) in reviewing ONS's official analysis of the 1991 census ethnicity question responses (Coleman and Salt, 1996). Ballard's view is that a genuine question about ethnicity – seeking a positive response regarding 'respondents' sense of belongingness to a community of some kind' (Ballard, 1996, p23) would be far preferable and useful in the longer term, than a question based largely around skin colour that has 'its primary emphasis on the difference — and indeed the alienness

— of those identified as outsider' (ibid). This aspect was accepted by those preparing the 2001 census, in that the additional term 'British' was appended to the heading of the Asian and black main categories in the 2001 (and 2011) census question.

Setting aside the conceptual differences between ethnicity and skin colour/origin, Ratcliffe (2008) argues that it is unrealistic to produce data to address issues of group aspirations and issues of disadvantage/discrimination in a single question. His view is that to address discrimination, information on how people are seen by others is needed; something which he believes census respondents cannot be asked to assess. Indeed, Ratcliffe suggests that the positioning of the white category (on the 1991 form) 'at the apex of the list and undifferentiated speaks volumes. White minorities remain invisible, irrespective of whether they face discrimination or have distinct needs and aspirations' (op cit, p70). His conclusion is that a census is not an appropriate mechanism for the measurement of ethnicity in a meaningful way. However, he acknowledges that through the inclusion of the ethnic group question 'we have a much-improved picture of the social landscape of Britain' (op cit, p71), and Ballard also accepts that 'the decision to include an explicit ethnic question in the 1991 Census of the United Kingdom was undoubtedly a major step forward' (Ballard, 1996, p3).

In the years that have followed the publication of the results of the 1991 census, Aspinall (2000b, 2007, 2011, 2013) has continued to express criticism of the form of the question. Specific concerns have related to the basing of groupings on skin colour; failing to address the ever-widening cultural background mix of people living in the UK; and an implied assumption of homogeneity within the categories provided, for example the 'Black African' and various Asian group. He has also expressed a preference for an open-response format rather than any pre-defined categories (Aspinall, 2012).

The use of pre-defined tick box categories is clearly of assistance in the coding and cleaning of data, however, as Nagel (2001, p381) puts it, 'the exclusion of certain groups from the census and other social texts is as significant as the inclusion of others in uncovering how societies construct and interpret 'race' and ethnicity'. By way of example, in the context of the absence of a specific Arab category, Jalili (undated c2006, p3) wrote that 'in psychological terms, they find the

lack of recognition as a group to be increasingly unacceptable'. This group features in Chapters 7 and 8 of the thesis, but did not achieve the 'status' of its own pre-defined tick box until the 2011 census.

So, where does all of this leave social scientists and other population researchers who wish or need to make use of the outputs from the census ethnic group question?

The underlying function of the census is the provision of information to assist government with social policy and finance decisions. It is thus not surprising that a truly-balanced and more widely-based question on ethnic origin/identity has never been pursued in the census – the focus, carried forward from the 1991 census, has been on identifying and categorising residents of non-European descent, with initially no (and more latterly limited) attempt to allow/encourage 'white' people to provide information on their background or community affiliation. This approach arose from the perceived needs in the 1980s, and the weaknesses of the approach are acknowledged by Peach (1996a) in his Introduction section to one of the ONS official volumes on the 1991 census.

However as Ballard (1996) points out, the arrival of material numbers of people from other countries in the 1950s to 1970s was by no means new. 'During the latter part of the nineteenth century Irish Catholic migrants settled in the major industrial cities of England and Scotland on an even larger scale' (Ballard, 1996, p4), followed by smaller numbers of Eastern European Jews at the end of the century, and by other Eastern Europeans immediately after the Second World War. The form of question was thus very much tailored to the specific situation of the mid/late twentieth century, rather than a question that might better withstand the test of time.

Pressure on space on the census form, together with a pragmatic need to ensure a reasonable consistency in response to what was very much an innovation in UK census questions perhaps inevitably led to a question that many would regard as defining ethnic group in too narrow a manner. The benefits of general consistency/compatibility with what had been measured previously has also inevitably led to an evolution, rather than major re-casting, of the question in 2001 and 2011.

It can, however be argued that ONS has not fully responded to the changes in the make-up of the population that have taken place, and the opportunities that write-

in responses do make available. In almost all 2011 census output, ethnic group is broken down into no more than the 18 categories shown on the 2011 census form, despite the write-in responses having identified a number of specific groups that are larger than at least one of the pre-defined groups. Examples include: White: Polish 510,561; Asian/Asian British: Sri Lankan 146,627; Asian/Asian British: Filipino 128,351; White: Italian 120,524 (Source: Census Table QS211EW)[30].

The reality of the situation is that we need to recognise that:

- Issues of ethnic/cultural background can be more clearly addressed by reference to a number of census questions.
- Although titled 'ethnic group', question 16 on the 2011 England and Wales census provides information on only visible difference/skin colour and a restricted range of national/regional origin.
- For many broad categories, some comparison with earlier census outputs is possible.
- The results produced are affected by the precise wording and form of the question, and the context provided by preceding and following questions; the motivations that respondents believe underlie the asking of the question in the first place; and variations in response rates by group and the effect of the imputation process
- The response is one of self-identification, not an external assessment, and that one respondent may have answered the question for all members of a family or household.

Providing these shortcomings are recognised in any use to which the data are applied, the census output does allow both spatial and socio-economic analysis and comparisons of groups to be made.

[30] Conversely, it is not clear why ONS has placed, for example, Black/African/Caribbean/Black British: Somali 37,708 and Black/African/Caribbean/Black British: Nigerian 2,021 write-in responses in the Black Other, rather than the Black African group.

Appendix B Univariate analysis of determinants of migration

As indicated in the preamble to Chapter 7, some simplified analyses were carried out in preparation for the regression analysis, looking at the impact of various characteristics on the propensity to migrate, but without controlling for the impact of other variables. That work was carried out in order to assist with the selection of variables for the regression analysis, and is summarised in this appendix. The tables within this section (which are located together after the text) indicate the proportion of the sample that exhibits the particular characteristic who are England and Wales internal migrants in the 2011 individual safeguarded microdata. Also shown in the tables are the number of internal migrants (for all usual residents, irrespective of religion or ethnic group) in the dataset, in order to give an indication of the weight that should be attached to a difference in behaviour. The tables also shows which of the cultural groups (A indicates Arab; C Chinese; J Jewish, and S Sikh) have a migration rate 95% confidence interval that lies wholly above or below the 95% interval for the white British group.

Table B.1 shows the proportion of movers against basic demographic characteristics of gender and age. The table indicates that the overall propensity to change residence is higher than for white Britons for Arabs, Chinese, and to a smaller degree Jews, and lower for Sikhs. The table also shows a slightly higher (but statistically significant) rate for males than females across all groups. Numerous studies have found that age explains more of the difference in migration propensity than other characteristics, notwithstanding that in reality, it is the life-course events (which have an association with age) rather than age itself that has the direct influence on migration (Tyrrell and Kraftl, 2015). The table indicates that all groups display much higher rates for the 19 to 29 age bands, but that for most age bands Arabs and Chinese have higher rates than the white British, with Sikhs exhibiting lower rates in all age bands.

Before moving away from age as an explanatory factor overall, Table B.2 provides migratory rates for individuals based on the age of their household reference person (HRP) – the most economically active person in the household. The age of that person will be particularly relevant in examining migration tendencies for dependent children, whose patterns will be determined by others in the household.

Indeed, the overall size and make-up of households may have a material impact on propensity to move. Table B.3 summarises migration rates for families and households grouped on three different bases – size (number of persons) in the household; whether the family is a couple or lone-parent one; and finally by the age and number of dependent children. The table shows a limited impact of household size on migration propensity for white British and Jewish households, but an inverse relationship for Arab, Chinese, and Sikh families. Migration rates are higher in Jewish, Sikh and White British lone-parent families than in couple families, and whilst the pattern is reversed for Arabs and Chinese, these latter differences between lone-parent and couple rates are not statistically significant. The clearest pattern does, however, emerge when families are differentiated by the number and age of dependent children. Whilst the individual rates vary (Chinese and Arabs almost always materially higher, and Sikhs always lower than white British) it is clear that the presence of secondary school age children dampens the likelihood of migration. (However, see Smith and Jöns, 2015 for research relating to migration to catchment areas for the 'right' school).

Notwithstanding the impact of the presence of dependent children, there are material differences in migration rates depending on a person's marital status, as set out in Table B.4, with broadly the same 'pecking order' within each cultural group – in all groups adult single persons and separated person have the highest propensity to migrate, and widowed persons the lowest (except for the white British group, where the widowed rate exceeds the married rate). The lower part of that table shows the 'living arrangement' of persons in households, rather than their formal marital status. This exposes the different migration rates for single, divorced, and widowed persons who are living in a couple (cohabiting) compared with those not living with a partner (and indeed the small number of people formally classified as married but living without a partner, or with a partner who is not their spouse). This classification presents a more effective categorisation than formal marital status in explaining migration rates.

Table B.5 demonstrates that there is variability between migration rates depending on the type of residence that a person or household occupies. It shows that, generally, migration rates are lower for occupants of detached houses and bungalows, increase for occupiers of semi-detached properties, and are highest for

occupiers of flats and other residence types. By far the highest rates are found amongst those living in educational establishments (halls of residence). Whilst such a categorising may provide a useful association with migration rates, like age, housing type must be a consequence of other individual or household attributes rather than a direct determinant itself. For example, qualifications and employment type, which have an impact on affluence, may impact on affordability of various housing types, or the ability to sustain various residential tenures (renting compared with ownership) whose availability also varies by house type.

Qualification levels are addressed in Table B.6. For each group, those with no qualifications are least mobile, and those with Level 3 qualifications are most likely to have moved in the 12 months preceding the census. It is, of course, worth noting that Level 3 is the standard generally required to achieve entry to a degree course, so the raised migration level for this group may be distorted by home to college moves by aspiring Level 4 qualification holders.

Socio-economic status is encapsulated in the National Statistics Socio-economic grade classification system (NS-Sec). This links a person's skill type and level, and level of responsibility, in seven principal classes (plus two residual groups for students and people with a long absence from the employment market). Results are summarised in the upper part of Table B.7. Whilst the migration rate for Class 4 (small employers and own-account workers) is consistently lower than other classes for all the cultural groups (and Class 1, higher managerial and professional occupations, is always highest), for the most part the differences in absolute migration rate by class are not very large. However, a more distinct pattern emerges if the same individuals are categorised by economic activity, as shown in the lower part of the table, suggesting that economic activity, rather than socio-economic class (or industry of employment – table not shown here, but also failing to identify material differences) is a more useful characteristic in explaining migration levels.

Returning to the subject of residence type, tenure, with its more direct relationship with affordability and flexibility to move than building type, may be a useful parameter to differentiate between migrants and non-migrants. Table B.8 summarises this aspect. It demonstrates that, for all groups, outright ownership of home (with its financial and psychological investment) is associated with very low migration rates, and private-sector renting with very high rates.

One final table relating to a household characteristic is presented. Table B.9 summarises the relationship between car and van availability and migration rates. For all groups, migration rates are highest for those without access to a car, and the availability of additional cars is almost always associated with a reducing level of migration. At one level this is counterintuitive – multi-car ownership could be thought to reflect affluence; affluence may be associated with higher managerial and professional occupations, but such occupations (NS-Sec Class 1) are associated with relatively high migration levels. Although car availability is a simple concept, its association with other characteristics is complex. High car ownership may be linked to there being a large number of (employed) adults in the household (which may weaken historic linkage between household residential location and place of employment of the principal or sole 'bread-winner'), or to rural living (poor public transport). However, car availability makes longer-distance commuting easier and thus reduces the need to change residential location on changing employment. Conversely, it could reflect 'forced' car purchase to avoid an unaffordable or impractical house move. Thus, whilst there appears to be a clear pattern between the level of car availability and propensity to migrate, it is an aspect too far removed from migration causation factors to be included in any model.

A further personal characteristic is summarised in Table B.10 – health. Previous studies have found that poor health acts to inhibit residential moves (Bailey and Livingston, 2005; Finney and Simpson, 2008; and see Darlington, Norman, and Gould, 2015 for a review of this area). Census data provide two (self-assessed) measures of health: general health which census respondents can categorise as very good, good, fair, bad, and very bad; and secondly, whether day to day activities are limited a lot, a little, or not at all by long-term health issues. Complementary to consideration of the impact of poor health on migration is the impact that providing care to others may have on propensity to move. This is also summarised in Table B.10. The table confirms that (for all groups) those in the poorest health, or with limitations on their day to day activities are less likely to be migrants, and that providing care for others does reduce migration propensity (see also Bailey and Livingston, 2005).

One final univariate comparison, potentially relevant to understanding the behaviour of cultural minority groups, has been undertaken, and this relates to the

country of birth of individuals in each group. The upper part of Table B.11 summarises the migration rate for each group based on country of birth. It is very important to remember that the rates shown here relate to internal movements in England and Wales in the 2010-11 period; they do not include international migration moves from overseas; all persons included in the table were thus resident in England and Wales by 12 months prior to the 2011 census. The table implies that internal migration rates are higher for Arabs and Chinese (and also for the majority of white British) born overseas compared with those born in the UK, and generally lower for Sikhs (and not significantly higher or lower for Jews). A clearer picture emerges if year of arrival, rather than country of birth, is used – as in the middle part of the table. In order to assist in interpreting the table, actual numbers involved are shown, as the proportion of UK born individuals varies greatly between the groups, as does their arrival pattern. However, the table indicates that individuals arriving in the UK between 2001 and 2010 are typically twice as likely to have moved house within the UK in the 2010-11 period as their UK-born counterparts. Indeed, those arriving in the 1990s have migration rates very similar to those born in the UK, whilst those arriving prior to 1990 have much lower rates (probably simply reflecting an older age profile). The different behaviours of recent arrivals may be the key factor behind the raised overall migration rate for Arabs and Chinese. Whilst it is easy to envisage recent immigrants seeking a more permanent, higher quality, place of residence after taking up lower-grade, temporary accommodation on arrival, as an explanation of higher migration rates, it is important be aware that both Arab and Chinese recent arrivals include a high proportion of students whose internal migration behaviour may not vary greatly from students in general (though few will have the option to live in the parental home).

Table B.1 Migration rate by gender and by age

Gender Age	Proportion Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
Total	18.7%	22.9%	11.4%	8.6%	10.2%	11.2%	610,072	ACJ	S
Male	20.8%	23.5%	12.1%	8.6%	10.5%	11.5%	308,779	ACJ	S
Female	15.7%	22.4%	10.7%	8.5%	10.0%	10.8%	301,293	ACJ	S
0 to 4	17.4%	21.0%	13.6%	10.3%	14.8%	15.1%	41,685	AC	S
5 to 18	12.4%	11.9%	8.2%	6.2%	8.7%	9.0%	81,658	AC	S
19 to 24	35.1%	51.5%	44.1%	20.2%	33.1%	32.7%	143,441	CJ	S
25 to 29	29.1%	34.8%	29.9%	15.2%	24.8%	25.4%	93,993	ACJ	S
30 to 39	22.0%	21.1%	16.1%	11.0%	13.8%	15.1%	110,362	ACJ	S
40 to 59	11.3%	8.6%	6.1%	4.3%	6.0%	6.4%	95,302	AC	S
60 and older	6.4%	3.4%	4.4%	2.5%	3.4%	3.5%	43,631	AJ	S

Table B.2 Migration rate by age of household reference person (HRP)

Age of Household Reference Person	Proportion of Persons in Households Moving in year prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
16 to 24	48.9%	62.1%	60.8%	48.9%	54.3%	53.0%	97,825	ACJ	S
25 to 29	32.8%	43.3%	33.2%	25.0%	28.9%	29.1%	95,872	ACJ	S
30 to 39	20.9%	23.3%	15.8%	11.9%	13.8%	15.0%	159,043	ACJ	S
40 to 59	11.9%	9.6%	6.9%	4.8%	6.6%	7.0%	169,793	AC	S
60 and older	6.3%	4.9%	3.9%	3.0%	3.3%	3.4%	47,280	ACJ	

Table B.3 Migration rate by household/family size and make-up

Household/Family Status, Size, and Make-up	Proportion of Household Residents Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
Number of residents in household:									
One	29.7%	25.8%	9.9%	14.6%	9.3%	10.4%	73,175	ACS	
Two	26.0%	24.4%	10.7%	13.2%	9.8%	10.8%	171,013	ACJS	
Three	21.0%	20.5%	12.2%	10.1%	10.5%	11.6%	121,959	ACJ	
Four	14.7%	19.1%	10.8%	7.2%	8.2%	9.2%	108,365	ACJ	S
Five or more	12.6%	18.3%	10.3%	5.7%	11.2%	11.0%	95,345	AC	JS
Family Type:									
In a couple family	14.4%	14.2%	8.5%	6.3%	7.6%	8.4%	304,574	ACJ	S
In a lone parent family	13.5%	12.1%	10.3%	8.2%	11.8%	12.0%	86,907		JS
Not in a family – aged below 65	33.7%	40.7%	28.7%	23.2%	23.5%	24.7%	167,600	ACJ	
Not in a family – age 65 and over	12.5%	3.6%	4.2%	3.7%	3.2%	3.3%	10,776	AJ	
Number of dependent children in family:									
No dependent children	15.2%	14.9%	8.2%	6.2%	7.4%	8.0%	160,478	ACJ	S
One dependent child aged 0-9	22.5%	20.5%	16.7%	12.2%	17.1%	17.8%	71,678	AC	S
One dependent child aged 10-18	7.3%	8.2%	6.1%	4.2%	5.8%	6.2%	28,088	C	S
Two or more, youngest aged 0-9	14.2%	14.6%	9.2%	7.3%	9.6%	10.0%	110,529	AC	S
Two or more, youngest aged 10-18	7.7%	6.1%	5.1%	3.8%	4.7%	5.1%	20,708	AC	S
Not in a family	32.6%	38.2%	19.1%	18.4%	16.0%	17.8%	178,376	ACJS	

Table B.4 Migration rate by formal marital status and living arrangement

Marital (including same-sex civil partnership) Status or Living Arrangement	Proportion Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
All age 0-15	13.9%	13.4%	9.0%	7.1%	9.8%	10.2%	100,329	AC	S
Formal marital status:									
Single (never married)	27.6%	36.8%	23.8%	13.6%	19.4%	20.0%	308,411	ACJ	S
Married	16.2%	13.0%	7.2%	6.9%	4.6%	5.9%	123,440	ACJS	
Separated	20.2%	18.0%	18.7%	15.2%	20.0%	19.6%	23,181		S
Divorced	15.6%	12.5%	9.7%	10.0%	9.1%	9.6%	39,190	AC	
Widowed	10.9%	4.3%	5.6%	2.8%	4.8%	4.9%	15,521	A	S
Living Arrangement:									
In Couple:									
Married (including separated)	14.9%	11.8%	7.0%	6.5%	4.3%	5.4%	109,375	ACJS	
Cohabiting	26.6%	33.1%	22.6%	17.7%	20.6%	21.3%	111,704	AC	S
Not in Couple:									
Single (never married)	25.8%	34.8%	21.1%	10.9%	15.9%	16.7%	187,331	ACJ	S
Married	24.7%	21.5%	11.8%	10.9%	12.9%	15.7%	9,498	AC	S
Separated	20.1%	17.1%	17.2%	16.6%	19.1%	18.8%	17,529		
Divorced	15.0%	11.0%	8.6%	9.2%	8.1%	8.6%	25,015	AC	
Widowed	10.2%	3.7%	4.0%	2.8%	3.0%	3.2%	9,076	A	

(All statuses include equivalent same sex civil partnership categories)

Table B.5 Migration rate by type of residence

Type of building of residence	Proportion Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
Detached house	13.7%	10.6%	6.2%	6.2%	6.5%	7.0%	93,563	AC	
Semi-detached house	13.4%	15.1%	8.1%	6.3%	7.4%	8.0%	145,333	ACJ	S
Terraced house	17.4%	20.5%	11.7%	8.0%	11.1%	11.3%	157,050	AC	S
A flat or other household residence	22.5%	31.3%	17.3%	20.0%	20.8%	20.8%	173,911	AC	J
Medical or care establishment	17.6%	20.8%	19.8%	15.4%	23.9%	23.9%	10,021		
Educational establishment	60.6%	45.3%	57.9%	75.6%	74.8%	69.5%	22,297		ACJ
All other communal establishments	51.7%	43.8%	28.6%	54.7%	42.5%	42.4%	7,897	S	J

Table B.6 Migration rate by qualifications

Qualifications	Proportion of Age 16 or more Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
None	16.5%	12.1%	6.7%	5.1%	5.9%	6.4%	65,840	ACJ	S
Level 1 to 2; apprenticeships; 'other'	19.9%	21.7%	8.8%	6.9%	9.2%	10.3%	174,581	AC	S
Level 3: 2+ A / AS levels	28.3%	40.6%	23.9%	16.5%	18.4%	19.1%	105,688	ACJ	S
Level 4+: Degree level	20.5%	26.2%	13.1%	11.3%	12.2%	13.5%	163,614	ACJ	S

Table B.7 Migration rate by socio-economic and employment status

Socio-Economic Classification (NS-Sec) and Economic Position	Proportion of Age 16 or more Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
NS-Sec:									
1 higher managerial and professional	21.5%	23.1%	11.3%	11.5%	10.4%	11.8%	49,463	AC	
2 lower managerial and professional	15.9%	18.3%	10.9%	9.1%	10.0%	10.7%	100,840	ACJ	S
3 intermediate	13.8%	14.3%	8.5%	7.2%	8.7%	9.3%	52,421	AC	S
4 small employers and own account	13.4%	10.4%	7.3%	6.3%	7.4%	8.3%	34,783	AC	S
5 lower supervisory and technical	17.4%	16.2%	9.8%	6.4%	8.7%	9.7%	31,973	AC	S
6 semi-routine	17.3%	13.7%	10.2%	7.3%	8.7%	9.6%	62,587	AC	S
7 routine	20.2%	15.2%	11.2%	5.1%	8.0%	9.1%	47,684	ACJ	S
never worked / long-term unemployed	15.2%	18.7%	8.7%	7.6%	13.2%	13.1%	34,217	AC	JS
full time students	30.7%	44.1%	32.2%	18.8%	25.1%	25.3%	95,755	ACJ	S
Economic Position:									
Part-time employee	16.1%	14.5%	8.5%	7.4%	8.0%	8.8%	50,010	AC	
Full time employee	19.8%	21.2%	15.7%	9.1%	12.3%	13.3%	209,075	ACJ	S
Self-employed	15.0%	12.4%	8.3%	7.1%	8.5%	9.4%	37,768	AC	S
Unemployed (seeking employment)	19.8%	23.2%	16.4%	8.8%	17.0%	17.1%	30,013	C	S
Retired	5.3%	3.6%	4.6%	2.5%	3.5%	3.5%	33,682	J	S
Students	30.7%	44.3%	32.2%	18.9%	26.1%	26.1%	94,840	ACJ	S
Looking after home/family	14.5%	16.8%	8.9%	8.0%	12.6%	12.8%	22,437	C	JS
Permanently sick/disabled	15.0%	6.4%	7.3%	5.0%	9.5%	9.5%	16,894	A	CS
All other inactive	17.5%	22.3%	11.1%	11.0%	15.2%	15.7%	15,004	C	JS

Table B.8 Migration rate and household residence tenure

Tenure of Residence	Proportion of Household Residents Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
Owns outright	8.4%	7.7%	4.5%	3.2%	3.7%	3.8%	53,737	ACJ	S
Owns with a mortgage or loan	8.6%	12.3%	7.0%	6.0%	5.9%	6.1%	130,324	ACJ	
Shared ownership	8.3%	22.8%	16.8%	14.6%	11.1%	12.1%	4,468	C	
Rented from council	11.3%	14.4%	8.1%	9.4%	8.6%	9.3%	44,628	AC	
Rented from RSL or housing assoc	13.2%	21.2%	12.6%	11.6%	10.8%	11.2%	45,086	AC	
Private landlord or letting agency	28.6%	42.3%	30.0%	30.2%	35.7%	33.7%	265,947	C	AJS
All other rental arrangements	25.9%	28.6%	22.9%	17.7%	25.1%	24.5%	18,227	C	S
Lives rent free	17.2%	22.9%	10.2%	12.3%	11.7%	12.9%	7,440	C	

Table B.9 Migration rate and car availability

Number of Cars Available	Proportion of Persons in Households Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
None	24.7%	36.0%	15.6%	16.7%	14.1%	16.0%	164,332	ACJS	
One	15.8%	17.7%	11.4%	9.9%	9.9%	10.7%	223,746	ACJ	
Two	12.2%	11.6%	8.5%	5.9%	8.1%	8.4%	138,830	AC	S
Three or more	8.8%	9.8%	8.7%	4.2%	7.2%	7.3%	42,949	CJ	S

Table B.10 Migration rates, health, and care provision

Health Issues and Care Responsibilities	Proportion Moving in 12 months prior to census						E & W migrants	Different from white British	
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents		Higher	Lower
Personal health:									
Very good health	19.6%	27.6%	13.5%	9.9%	12.2%	13.1%	334,554	ACJ	S
Good health	18.4%	20.2%	10.6%	8.4%	9.7%	10.7%	200,959	ACJ	S
Fair, bad, or very bad health	15.8%	12.0%	6.3%	5.4%	6.7%	7.1%	74,559	AC	S
Long-term health problem limiting day to day activities:									
Not limited	19.3%	23.8%	12.4%	9.2%	11.2%	12.2%	543,820	ACJ	S
Limited a little or a lot	14.5%	9.6%	6.6%	4.8%	6.4%	6.6%	66,252	AC	S
Provides unpaid care to others:									
No	19.0%	23.5%	12.1%	8.9%	10.8%	11.7%	574,890	ACJ	S
Yes	14.5%	13.5%	5.6%	6.0%	5.6%	6.1%	35,182	AC	

Table B.11 Migration rates and country of birth / year of arrival in UK

Country of Birth Year of Arrival in UK	Proportion Moving in 12 months prior to census						E & W migrants
	Arab	Chinese	Jewish	Sikh	White British	All Usual Residents	
United Kingdom born	14.3%	16.7%	11.1%	9.5%	10.2%	10.4%	493,535
Country of Birth:							
Rest of Europe	22.1%	33.2%	12.0%	16.0%	13.1%	18.4%	46,886
Africa	17.9%	20.6%	11.7%	4.1%	13.9%	16.0%	20,288
Middle East and Asia	21.5%	24.8%	12.5%	7.5%	10.6%	15.4%	37,220
Rest of the World	21.2%	28.0%	15.8%	20.9%	15.2%	15.3%	12,143
Year of Arrival in UK:							
before 1981	5.2%	4.6%	4.2%	2.4%	6.1%	4.3%	7,763
1981-1990	9.6%	8.4%	8.7%	4.4%	20.8%	9.8%	6,325
1991-2000	14.2%	17.4%	13.3%	8.7%	19.3%	13.5%	16,661
2001-2006	20.8%	28.8%	19.1%	15.5%	19.6%	21.0%	40,204
2007-2010	33.2%	45.6%	26.7%	24.2%	31.6%	32.6%	45,584
Population Sample Size:							
United Kingdom born	2,954	8,694	20,858	23,201	4,352,152	4,768,365	493,535
arriving before 2001	3,266	11,943	3,018	13,444	75,211	370,477	30,749
arriving 2001-2010	4,199	13,881	1,676	4,179	16,752	331,120	85,788

Appendix C Migration patterns supplementary material

Tables relating to the 2010-11 period

Table C.1 Inter-super region migration patterns 2010-11

		Destination				Destination as percentage of flow from origin		
Group	Origin	London	SE & E England	Rest of E & W	Total	London	SE & E England	Rest of E & W
Arab	London	13900	800	**700**	15400	90%	5%	**5%**
	SE & E England	800	**4100**	**900**	**5700**	14%	**72%**	**16%**
	Rest of England and Wales	1000	800	**16200**	**18000**	6%	4%	**90%**
	Beyond England and Wales	4800	**2600**	**8200**	**15500**	31%	**17%**	**53%**
	Total	20400	**8200**	**26000**	**54600**	37%	**15%**	**48%**
Chinese	London	**19700**	**2200**	**1700**	**23600**	**83%**	**9%**	**7%**
	SE & E England	**2400**	**11100**	**2400**	**15900**	**15%**	**70%**	**15%**
	Rest of England and Wales	**2500**	**1900**	**35700**	**40000**	**6%**	**5%**	**89%**
	Beyond England and Wales	**8600**	**8300**	**24500**	**41400**	**21%**	**20%**	**59%**
	Total	**33200**	**23400**	**64200**	**120800**	**27%**	**19%**	**53%**
Jewish	London	12700	1700	**1100**	15500	82%	11%	**7%**
	SE & E England	1200	3600	**600**	5400	22%	67%	**11%**
	Rest of England and Wales	800	400	**6600**	**7800**	10%	5%	**85%**
	Beyond England and Wales	2800	**700**	1100	4700	60%	**15%**	23%
	Total	17600	6400	**9400**	33400	53%	19%	**28%**
Sikh	London	8400	1700	**900**	11000	76%	15%	**8%**
	SE & E England	800	4700	**900**	6400	13%	73%	**14%**
	Rest of England and Wales	900	800	16400	18000	5%	4%	91%
	Beyond England and Wales	**2300**	1000	**2600**	**6000**	**38%**	17%	**43%**
	Total	12400	8100	20800	41300	30%	20%	50%
White British	London	314000	93300	43100	450400	70%	21%	10%
	SE & E England	64000	1028100	**133300**	1225500	5%	84%	**11%**
	Rest of England and Wales	49400	105000	2714500	2868900	2%	4%	95%
	Beyond England and Wales	33000	57300	108900	199200	17%	29%	55%
	Total	460400	1283800	2999800	4744000	10%	27%	63%

Bold numbers indicate that students make up at least 30% of the category
Underlined bold numbers indicate that students make up at least 60% of the category
Source: Author calculations based on 2011 SMS tables; student proportions derived from 2011 microdata

Table C.2 Arab inter-community moves 2010-11

Origin Arab community	Destination Arab community: NW & W London	NE London	Manchester	Birmingham	Sheffield	SW London	Liverpool	Cardiff	Leeds	Bradford	Leicester	Newcastle	Nottingham	Brighton	Coventry	Total
NW & W London		448	47	26	34	219	24	23	24	6	15	9	8	14	21	918
NE London	455		23	8	3	21	3	0	2	0	17	6	3	6	4	551
Manchester	82	8		22	26	0	35	0	26	12	11	5	5	1	11	244
Birmingham	70	5	19		13	4	2	2	8	9	6	0	4	0	7	149
Sheffield	31	3	19	7		6	14	7	23	4	8	0	5	4	0	131
SW London	172	11	4	6	3		0	0	5	0	7	3	2	5	2	220
Liverpool	8	12	28	6	8	0		0	4	25	2	0	2	1	6	102
Cardiff	47	6	11	2	0	5	0		1	0	10	0	4	4	3	93
Leeds	32	22	23	6	9	6	9	6		18	12	9	5	3	7	167
Bradford	9	0	6	6	1	0	5	0	19		2	3	4	0	5	60
Leicester	24	11	11	12	7	0	6	1	6	0		0	9	0	1	88
Newcastle	31	1	4	0	7	0	6	0	6	1	0		4	1	8	69
Nottingham	13	10	3	8	7	6	3	0	4	0	26	0		0	6	86
Brighton	31	4	17	1	2	0	19	0	2	0	14	1	0		13	104
Coventry	14	2	5	10	4	1	0	1	1	14	20	8	0	0		80
Total	1019	543	220	120	124	268	126	40	131	89	150	44	55	39	94	3062

Source (Tables C.2 to C.5): Author calculations based on 2011 SMS tables

Table C.3 Chinese inter-community moves 2010-11

Origin Chinese community	Destination Chinese Community: E & SE London	Inner N London	NW London	Manchester	Birmingham	West London	Liverpool	Leeds	SW London	Sheffield	Nottingham	Newcastle	Croydon	Leicester	Cambridge	Bristol	Redbridge	Cardiff	Coventry	Oxford	Southampton	Brighton	Milton Keynes	Portsmouth	York	Hull	Total
E & SE London		921	302	52	68	168	24	24	223	13	24	6	229	33	47	22	149	18	25	22	65	18	9	11	13	6	2492
Inner N London	1269		409	30	25	305	3	3	87	14	16	17	52	10	59	21	18	18	19	47	20	7	5	1	13	5	2473
NW London	311	310		39	28	112	7	23	54	12	13	6	41	33	19	15	25	8	15	17	9	4	6	11	3	4	1125
Manchester	74	80	18		42	15	36	59	7	33	17	13	10	24	15	12	3	7	10	5	7	2	9	4	10	4	516
Birmingham	70	57	22	31		12	15	10	5	15	29	24	8	29	25	8	0	13	23	9	5	4	9	5	5	2	435
West London	246	157	91	7	34		4	8	72	6	18	5	15	17	10	6	2	4	4	7	12	12	5	5	3	4	754
Liverpool	24	18	8	93	32	3		16	2	16	20	6	4	5	2	14	0	0	12	4	2	3	3	3	4	0	294
Leeds	38	25	19	64	15	8	23		12	24	16	25	7	21	5	5	1	2	11	2	3	1	0	0	18	14	359
SW London	139	88	19	9	3	31	5	2		6	5	4	55	17	11	4	3	0	4	3	8	2	0	2	3	2	425
Sheffield	21	28	5	54	21	12	13	26	4		24	10	0	21	2	9	0	13	12	7	10	1	4	1	5	2	305
Nottingham	35	55	32	20	40	12	9	23	2	10		7	1	35	9	11	1	2	20	2	8	1	5	0	8	7	355
Newcastle	22	24	16	31	5	5	2	16	4	4	16		2	11	5	6	0	1	8	4	6	0	0	2	7	4	201
Croydon	127	55	17	9	3	10	2	0	21	4	3	5		7	5	4	1	0	10	3	2	6	2	0	1	1	298
Leicester	58	31	13	27	51	6	9	20	5	3	24	5	1		6	5	1	2	12	4	9	5	7	1	1	2	308
Cambridge	88	121	19	25	31	16	0	12	21	15	14	5	3	21		9	2	3	10	37	18	19	2	7	6	0	504
Bristol	34	35	11	22	19	11	1	4	6	3	1	3	1	4	11		1	18	7	1	7	3	10	1	5	1	220
Redbridge	76	20	11	6	2	18	0	1	3	2	4	1	14	6	2	0		1	5	2	2	2	0	2	1	1	182
Cardiff	26	18	4	17	11	0	1	1	0	0	1	1	8	3	7	16	0		3	3	6	0	0	1	0	0	127
Coventry	73	41	14	9	63	5	0	3	4	3	3	5	3	32	6	10	0	9		3	8	0	4	0	5	3	306
Oxford	64	85	10	10	20	10	3	4	2	1	4	2	3	7	25	7	0	3	8		3	3	1	2	8	2	287
Southampton	31	23	6	10	14	19	0	0	6	2	1	0	4	1	5	4	0	2	6	6		1	0	7	4	1	153
Brighton	33	31	7	15	8	9	0	0	6	9	8	6	9	7	6	6	1	0	5	5	5		0	2	4	0	182
Milton Keynes	8	8	4	5	4	7	0	1	3	4	3	2	2	13	4	4	0	0	1	3	3	2		0	1	0	82
Portsmouth	7	4	7	0	5	4	8	2	2	6	3	1	0	11	0	1	0	0	3	4	14	3	0		1	2	88
York	20	22	6	17	5	3	0	17	4	4	3	6	2	8	6	1	0	4	4	3	3	0	0	0		0	138
Hull	9	4	6	16	19	3	3	9	0	5	6	4	0	2	0	5	0	2	3	0	5	0	0	2	7		110
Total	2903	2261	1076	618	568	804	168	284	555	214	276	169	474	378	292	205	208	130	240	203	240	99	81	70	136	67	12719

Table C.4 Sikh inter-community moves 2010-11

	Destination Sikh community																		
Origin Sikh community	West Midlands	W London/Slough	NE London	Coventry	Leicester	Leeds/Bradford	Gravesend	Derby	SE London	Luton	Nottingham	Manchester	Southampton	Bedford	Huddersfield	Bristol	Telford	Wokingham	Total
West Midlands		162	57	129	104	45	18	22	17	23	99	68	11	7	14	16	18	4	814
W London/Slough	246		81	52	86	16	56	13	22	24	59	11	23	10	7	15	6	28	755
NE London	64	126		9	30	6	32	0	35	12	9	5	12	3	3	8	8	2	364
Coventry	158	43	18		57	5	10	7	4	1	35	5	4	2	2	3	1	0	355
Leicester	129	51	24	38		9	13	19	9	5	32	7	2	6	6	1	3	1	355
Leeds/Bradford	42	51	11	21	15		0	13	0	0	11	21	1	3	19	1	1	1	211
Gravesend	27	32	21	5	8	2		1	15	2	3	1	3	0	3	0	0	1	124
Derby	54	20	13	12	17	8	3		1	0	25	10	2	0	0	3	3	1	172
SE London	6	37	34	3	10	4	36	0		2	2	3	0	0	2	0	0	0	139
Luton	28	16	16	8	2	4	1	0	0		8	2	2	3	0	1	0	0	91
Nottingham	32	15	12	6	13	4	2	3	2	1		2	0	2	0	3	4	2	103
Manchester	20	18	7	2	3	6	1	6	0	2	0		2	0	0	2	1	0	70
Southampton	9	14	5	5	1	0	1	11	0	1	1	1		0	0	0	0	1	50
Bedford	26	12	2	1	7	2	2	0	0	5	2	0	0		0	0	0	0	59
Huddersfield	13	15	3	2	3	14	3	0	0	0	1	1	0	0		0	0	0	55
Bristol	5	12	1	0	1	0	1	1	1	1	1	1	0	0	0		0	0	25
Telford	22	6	0	2	6	4	2	0	0	0	0	1	0	0	0	4		0	47
Wokingham	7	26	1	2	5	0	0	0	0	1	1	1	0	0	0	0	2		46
Total	888	656	306	297	368	129	181	96	106	80	289	140	62	36	56	57	47	41	3835

Table C.5 White British inter-community moves 2010-11

Destination white British community

Origin white British community	London	Gtr Manchester	W Midlands	W Yorkshire	Merseyside	S Yorkshire	Tyne & Wear	Bristol	Cardiff	Plymouth	Hull	Medway	Brighton	Swansea	Stoke-on-Trent	Nottingham	Warrington	Derby	Southampton	Milton Keynes	Total
London		2629	2232	2279	1066	1052	977	1698	644	467	177	1440	3254	310	121	1226	133	216	942	593	21456
Gtr Manchester	3392		941	3417	2857	1531	671	274	175	125	113	85	116	64	190	399	1412	99	67	103	16031
W Midlands	2763	966		828	560	702	245	321	271	181	58	66	154	141	275	633	73	362	177	128	8904
W Yorkshire	3289	3040	744		921	3519	1384	192	124	82	392	37	127	37	69	449	146	166	62	104	14884
Merseyside	1480	3004	429	1013		645	355	121	90	50	64	38	74	18	78	127	838	48	32	44	8548
S Yorkshire	1378	1192	573	3202	415		576	134	84	70	244	51	73	31	59	331	67	161	34	47	8722
Tyne & Wear	1420	707	233	1130	278	416		87	35	45	70	19	41	15	31	123	27	39	25	31	4772
Bristol	1991	232	268	184	89	130	60		311	195	9	13	106	97	7	67	6	27	77	29	3898
Cardiff	1034	152	187	77	69	44	32	398		86	9	21	35	494	9	34	2	9	70	22	2784
Plymouth	527	98	154	60	69	50	48	254	101		18	33	59	37	16	16	5	22	46	31	1644
Hull	231	135	85	433	82	255	96	15	6	19		1	10	3	8	27	11	17	7	11	1452
Medway	892	54	84	48	26	33	34	22	24	14	14		73	5	5	31	8	14	45	20	1446
Brighton	2344	103	92	85	63	74	52	118	49	22	11	45		12	5	29	3	12	77	20	3216
Swansea	337	48	91	41	38	21	27	111	690	31	2	10	18		7	17	5	6	26	16	1542
Stoke-on-Trent	140	225	207	97	97	106	22	21	5	24	7	6	8	4		46	24	62	10	10	1121
Nottingham	1290	204	278	249	82	255	84	84	23	19	20	28	36	7	14		34	163	17	27	2914
Warrington	168	1319	107	257	848	135	61	19	13	19	7	7	13	13	26	23		4	9	12	3060
Derby	211	142	215	135	68	209	24	32	22	16	19	20	9	11	35	261	10		10	25	1474
Southampton	926	62	85	50	33	31	29	127	66	45	1	20	99	11	8	14	5	17		24	1653
Milton Keynes	505	96	144	66	64	81	32	21	16	19	12	5	38	9	9	94	3	19	28		1261
Total	24318	14408	7149	13651	7725	9289	4809	4049	2749	1529	1247	1945	4343	1319	972	3947	2812	1463	1761	1297	110782

Table C.6 Multinomial logistic regression parameter estimates (Arab movers 2010-11)

super region of destination		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
	Movers originating in London						
London	Intercept	1.74	0.76	*			
compared with	Not student	1.55	0.39	***	4.69	2.19	10.06
Rest of E & W	age up to 24	-0.23	0.38		0.80	0.38	1.69
	age 60 and over						
	intermediate quals	-0.56	0.50		0.57	0.22	1.51
	degree qualified	-0.34	0.56		0.71	0.24	2.12
	home not owned	0.49	0.43		1.64	0.71	3.79
SE & E	Intercept	-1.12	1.17				
compared with	Not student	0.68	0.59		1.98	0.63	6.23
Rest of E & W	age up to 24	-0.56	0.60		0.57	0.18	1.83
	age 60 and over						
	intermediate quals	0.46	0.83		1.59	0.31	8.10
	degree qualified	0.93	0.89		2.54	0.45	14.41
	home not owned	0.04	0.60		1.04	0.32	3.37
	Movers originating in SE & E England						
London	Intercept	-2.50	1.27	*			
compared with	Not student	2.41	0.62	***	11.08	3.31	37.12
Rest of E & W	age up to 24	0.32	0.56		1.38	0.46	4.14
	age 60 and over						
	intermediate quals	1.79	0.77	*	5.99	1.34	26.88
	degree qualified	1.25	0.86		3.48	0.65	18.69
	home not owned	-0.31	0.78		0.73	0.16	3.36
SE & E	Intercept	0.73	0.97				
compared with	Not student	1.48	0.47	**	4.40	1.75	11.09
Rest of E & W	age up to 24	0.00	0.41		1.00	0.45	2.20
	age 60 and over						
	intermediate quals	0.86	0.59		2.36	0.75	7.45
	degree qualified	0.50	0.64		1.64	0.47	5.72
	home not owned	-0.44	0.66		0.65	0.18	2.37
	Movers originating in the Rest of England & Wales						
London	Intercept	-6.59	1.01	***			
compared with	Not student	1.19	0.38	**	3.27	1.55	6.91
Rest of E & W	age up to 24	1.18	0.38	**	3.24	1.55	6.78
	age 60 and over						
	intermediate quals	1.24	0.44	**	3.45	1.46	8.14
	degree qualified	1.84	0.50	***	6.31	2.36	16.87
	home not owned	1.34	0.74		3.82	0.90	16.25
SE & E	Intercept	-3.76	0.97	***			
compared with	Not student	0.44	0.50		1.56	0.58	4.18
Rest of E & W	age up to 24	0.64	0.48		1.90	0.74	4.86
	age 60 and over						
	intermediate quals	0.47	0.53		1.59	0.57	4.49
	degree qualified	0.12	0.68		1.13	0.30	4.25
	home not owned	-0.53	0.52		0.59	0.22	1.62

Reference covariates category: student, age 25-59, home owner, with no qualifications
Significance level: *** 0.1% ** 1% * 5%

Table C.7 Multinomial logistic regression parameter estimates (Chinese movers 2010-11)

super region of destination		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
	Movers originating in London						
London	Intercept	3.04	0.50	***			
compared with	Not student	0.44	0.25		1.55	0.95	2.53
Rest of E & W	age up to 24	-0.15	0.25		0.86	0.53	1.39
	age 60 and over						
	intermediate quals	-0.40	0.34		0.67	0.35	1.30
	degree qualified	0.20	0.34		1.22	0.63	2.36
	home not owned	-0.60	0.26	*	0.55	0.33	0.92
SE & E	Intercept	1.68	0.58	**			
compared with	Not student	0.37	0.31		1.44	0.78	2.67
Rest of E & W	age up to 24	-0.17	0.30		0.84	0.47	1.52
	age 60 and over						
	intermediate quals	-0.86	0.39	*	0.42	0.20	0.91
	degree qualified	-0.36	0.39		0.70	0.33	1.50
	home not owned	-1.06	0.30	***	0.35	0.20	0.62
	Movers originating in SE & E England						
London	Intercept	0.76	0.57				
compared with	Not student	0.31	0.27		1.37	0.81	2.31
Rest of E & W	age up to 24	-0.45	0.27		0.64	0.38	1.08
	age 60 and over	-1.40	0.76		0.25	0.06	1.10
	intermediate quals	-0.19	0.40		0.83	0.38	1.80
	degree qualified	0.27	0.39		1.31	0.61	2.81
	home not owned	-0.59	0.27	*	0.56	0.33	0.94
SE & E	Intercept	3.73	0.47	***			
compared with	Not student	-0.14	0.22		0.87	0.57	1.35
Rest of E & W	age up to 24	-1.14	0.23	***	0.32	0.21	0.50
	age 60 and over	-1.38	0.54	*	0.25	0.09	0.73
	intermediate quals	-1.00	0.31	**	0.37	0.20	0.68
	degree qualified	-0.90	0.32	**	0.41	0.22	0.76
	home not owned	-0.60	0.23	**	0.55	0.35	0.86
	Movers originating in the Rest of England & Wales						
London	Intercept	-5.77	0.45	***			
compared with	Not student	0.73	0.17	***	2.08	1.48	2.91
Rest of E & W	age up to 24	0.74	0.17	***	2.10	1.50	2.93
	age 60 and over	-0.31	1.03		0.73	0.10	5.55
	intermediate quals	1.70	0.35	***	5.45	2.73	10.87
	degree qualified	2.48	0.34	***	11.90	6.09	23.23
	home not owned	0.51	0.20	**	1.67	1.13	2.47
SE & E	Intercept	-4.42	0.40	***			
compared with	Not student	0.34	0.19		1.40	0.96	2.04
Rest of E & W	age up to 24	0.30	0.19		1.35	0.94	1.94
	age 60 and over	1.21	0.51	*	3.37	1.25	9.07
	intermediate quals	0.94	0.29	**	2.55	1.44	4.51
	degree qualified	1.50	0.28	***	4.48	2.59	7.78
	home not owned	0.24	0.20		1.27	0.86	1.88

Reference covariates category: student, age 25-59, home owner, with no qualifications
Significance level: *** 0.1% ** 1% * 5%

Table C.8 Multinomial logistic regression parameter estimates (Sikh movers 2010-11)

		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
super region of destination						Lower Bound	Upper Bound
	Movers originating in London						
London	Intercept	1.82	0.62	**			
compared with	Not student	1.32	0.34	***	3.73	1.91	7.30
Rest of E & W	age up to 24	-0.44	0.31		0.64	0.35	1.17
	age 60 and over	-1.27	0.54	*	0.28	0.10	0.82
	intermediate quals	-0.90	0.41	*	0.41	0.18	0.91
	degree qualified	-1.17	0.42	**	0.31	0.14	0.71
	home not owned	0.72	0.26	**	2.05	1.22	3.42
SE & E	Intercept	0.59	0.73				
compared with	Not student	0.73	0.41		2.08	0.93	4.66
Rest of E & W	age up to 24	-0.27	0.36		0.77	0.38	1.55
	age 60 and over	-1.04	0.67		0.35	0.10	1.30
	intermediate quals	-0.04	0.47		0.96	0.38	2.42
	degree qualified	-0.45	0.50		0.64	0.24	1.68
	home not owned	-0.44	0.31		0.64	0.35	1.17
	Movers originating in SE & E England						
London	Intercept	-0.67	0.97				
compared with	Not student	0.74	0.50		2.11	0.79	5.58
Rest of E & W	age up to 24	-0.15	0.44		0.86	0.37	2.02
	age 60 and over	-0.07	1.47		0.93	0.05	16.53
	intermediate quals	-0.82	0.63		0.44	0.13	1.51
	degree qualified	-0.07	0.65		0.93	0.26	3.32
	home not owned	0.99	0.36	**	2.68	1.32	5.46
SE & E	Intercept	2.84	0.75	***			
compared with	Not student	0.81	0.39	*	2.25	1.05	4.80
Rest of E & W	age up to 24	-0.59	0.34		0.55	0.29	1.07
	age 60 and over	0.24	1.07		1.27	0.16	10.38
	intermediate quals	-1.76	0.49	***	0.17	0.07	0.45
	degree qualified	-1.94	0.52	***	0.14	0.05	0.40
	home not owned	0.04	0.29		1.04	0.59	1.83
	Movers originating in the Rest of England & Wales						
London	Intercept	-4.90	0.59	***			
compared with	Not student	0.18	0.32		1.20	0.64	2.25
Rest of E & W	age up to 24	0.90	0.28	**	2.45	1.42	4.23
	age 60 and over	0.35	0.76		1.42	0.32	6.24
	intermediate quals	0.61	0.38		1.84	0.87	3.88
	degree qualified	1.77	0.37	***	5.85	2.84	12.06
	home not owned	0.78	0.26	**	2.19	1.31	3.64
SE & E	Intercept	-5.16	0.67	***			
compared with	Not student	0.22	0.38		1.25	0.59	2.62
Rest of E & W	age up to 24	0.62	0.30	*	1.86	1.03	3.36
	age 60 and over	1.17	0.58	*	3.21	1.04	9.92
	intermediate quals	0.88	0.47		2.41	0.96	6.05
	degree qualified	2.25	0.45	***	9.47	3.94	22.76
	home not owned	0.43	0.27		1.54	0.90	2.63

Reference covariates category: student, age 25-59, home owner, with no qualifications
Significance level: *** 0.1% ** 1% * 5%

Table C.9 Multinomial logistic regression parameter estimates (white British movers 2010-11)

super region of destination		B	Std. Error	Sig.	Exp(B)	95% Confidence Interval for Exp(B) Lower Bound	Upper Bound
	Movers originating in London						
London	Intercept	1.02	0.09	***			
compared with	Not student	1.29	0.05	***	3.62	3.26	4.02
Rest of E & W	age up to 24	-0.40	0.05	***	0.67	0.61	0.73
	age 60 and over	-1.02	0.06	***	0.36	0.32	0.41
	intermediate quals	-0.48	0.06	***	0.62	0.56	0.69
	degree qualified	-0.35	0.06	***	0.71	0.63	0.79
	home not owned	0.75	0.04	***	2.12	1.97	2.28
SE & E	Intercept	0.93	0.10	***			
compared with	Not student	0.82	0.06	***	2.27	2.01	2.57
Rest of E & W	age up to 24	-0.39	0.05	***	0.68	0.61	0.75
	age 60 and over	-0.37	0.07	***	0.69	0.60	0.79
	intermediate quals	-0.44	0.06	***	0.65	0.57	0.73
	degree qualified	-0.74	0.06	***	0.48	0.42	0.54
	home not owned	-0.26	0.04	***	0.77	0.71	0.83
	Movers originating in SE & E England						
London	Intercept	-2.40	0.08	***			
compared with	Not student	0.83	0.05	***	2.30	2.10	2.52
Rest of E & W	age up to 24	0.09	0.04	*	1.10	1.02	1.18
	age 60 and over	-0.78	0.07	***	0.46	0.40	0.52
	intermediate quals	0.32	0.06	***	1.38	1.24	1.53
	degree qualified	1.25	0.06	***	3.48	3.12	3.88
	home not owned	0.59	0.04	***	1.80	1.67	1.93
SE & E	Intercept	1.45	0.05	***			
compared with	Not student	1.51	0.03	***	4.55	4.31	4.80
Rest of E & W	age up to 24	-0.30	0.03	***	0.74	0.70	0.78
	age 60 and over	-0.64	0.03	***	0.53	0.49	0.56
	intermediate quals	-0.54	0.03	***	0.58	0.55	0.61
	degree qualified	-0.93	0.03	***	0.40	0.37	0.42
	home not owned	0.14	0.02	***	1.15	1.10	1.20
	Movers originating in the Rest of England & Wales						
London	Intercept	-6.70	0.09	***			
compared with	Not student	-0.30	0.04	***	0.74	0.68	0.80
Rest of E & W	age up to 24	0.85	0.03	***	2.34	2.19	2.50
	age 60 and over	-0.06	0.08		0.94	0.81	1.10
	intermediate quals	1.51	0.07	***	4.53	3.93	5.23
	degree qualified	3.34	0.07	***	28.33	24.64	32.56
	home not owned	0.63	0.04	***	1.87	1.74	2.01
SE & E	Intercept	-4.11	0.05	***			
compared with	Not student	-0.19	0.03	***	0.83	0.78	0.88
Rest of E & W	age up to 24	0.56	0.02	***	1.75	1.67	1.83
	age 60 and over	0.64	0.04	***	1.89	1.76	2.03
	intermediate quals	0.63	0.03	***	1.88	1.77	2.00
	degree qualified	1.47	0.03	***	4.34	4.08	4.62
	home not owned	-0.09	0.02	***	0.91	0.87	0.95

Reference covariates category: student, age 25-59, home owner, with no qualifications
Significance level: *** 0.1% ** 1% * 5%

Table C.10 Most popular receiving authorities for students

Arab		Chinese		Jewish		Sikh		white British	
Manchester	511	Manchester	1896	Gateshead	737	Birmingham	648	Leeds	21,222
Leeds	384	Nottingham	1458	Birmingham	552	Nottingham	450	Sheffield	19,911
Sheffield	374	Birmingham	1424	Nottingham	523	Leicester	318	Manchester	18,881
Liverpool	314	Camden	1352	Leeds	354	Manchester	235	Nottingham	16,377
Cardiff	287	Sheffield	1281	Manchester	314	Sheffield	167	Newcastle	14,639
Westminster	272	Cambridge	1096	Oxford	287	Coventry	152	Cardiff	14,125
Camden	254	Coventry	978	Cambridge	218	Hillingdon	140	Birmingham	14,012
Leicester	247	Leicester	947	Salford	167	Leeds	131	Liverpool	13,572
Nottingham	232	Oxford	900	Bristol	149	Welwyn Hatf'd	106	Bristol	11,744
Southampton	224	Liverpool	842	Liverpool	143	Southwark	103	Oxford	11,695

Numbers are the gross gain in students non-term to term time in 2011

Source: Author calculations based on analysis of 2011 standard and out-of-term output area tables (ethnic group and religion)

Table explanatory note. The SMS and the microdata both provide information on continuity or change of address from the date 12 months prior to the census and census day. That is, between a term time date in 2010 and a term time date in 2011. Use of standard census output tables and census out-of-term time tables can provide a comparison of out of term time addresses lived at at any point in the 12 months prior to the census, and census (March 2011) term time addresses. This comparison does not provide migration information as such, but permits the popularity of various locations for non-home-based study to be identified. Using Output Area (OA) geography - the basic building blocks of census output with about 300 residents – and assuming that each is either a supplier or a receiver of students, Table C.10 can be constructed. It shows the top 10 localities for study for each group. For most groups, their top 10 fall within the top 20 for all England and Wales residents. Notable exceptions are Gateshead, location of a series of seminaries rather than any secular institution, in the Jewish list, and Hillingdon, Welwyn Hatfield, and Southwark (home to Brunel University, the University of Hertfordshire, and London South Bank University, respectively) in the Sikh top 10. We can also contrast the north-south balance of place of normal residence of the groups, and the proportion of term time locations in each area (see Table C.11). The disparity is particularly stark for the Jewish group, and is reflected in the impact on the north-south drift calculations discussed in the text of the paper.

Table C.11 Proportion of E&W total found in London, SE, and E England (2011)

	Arab	Chinese	Jewish	Sikh	White British
Place of usual residence (whole group)	59%	54%	76%	47%	35%
Term time locality (students)	42%	42%	30%	36%	29%

Tables relating to the ONS Longitudinal Study and the 2001-11 and 1971/81-2001/11 periods

All tables in this section are author-prepared from ONS LS output. Where necessary, entries have been suppressed or modified to comply with ONS avoidance of disclosure requirements, and have been cleared for publication by ONS via a final outputs clearance (foc) form dated 2 December 2016.

Table C.12 Summary of group LS members by region and census presence

	Regional Presence in					Regional Presence in				
Region	1971	1981	1991	2001	2011	1971	1981	1991	2001	2011
	Chinese					**Jewish**				
North East	*	38	55	47	141	13	17	24	40	53
North West	39	128	217	255	475	201	235	269	320	329
Yorks & Humber	24	72	119	156	319	92	105	118	134	119
East Midlands	20	57	124	178	284	23	21	32	40	54
West Midlands	26	74	140	199	338	38	39	43	58	47
East of England	40	114	185	290	419	91	157	255	371	429
Inner London	72	153	426	407	782	332	317	391	472	580
Outer London	62	191	373	432	651	754	917	990	1188	1147
South East	46	146	268	377	617	74	120	167	202	212
South West	19	56	85	149	257	22	40	56	89	85
Wales	*	34	53	69	134	16	20	26	29	27
Total	361	1,063	2,045	2,559	4,417	1,656	1,988	2,371	2,943	3,082
	Sikh					**White British**				
North East	*	36	51	77	102	16,845	19,681	22,401	25,241	24,778
North West	19	37	60	89	120	42,397	49,252	56,223	64,193	63,133
Yorks & Humber	89	164	206	266	335	30,062	35,531	41,404	47,914	47,040
East Midlands	138	287	402	539	682	22,640	28,092	33,530	40,118	40,211
West Midlands	492	986	1267	1649	2118	31,302	36,534	41,821	47,971	45,990
East of England	72	158	227	269	358	29,384	37,471	45,157	54,010	54,592
Inner London	75	141	150	160	208	13,023	11,721	11,882	12,637	12,696
Outer London	333	676	942	1279	1736	24,469	26,242	27,794	29,743	25,827
South East	131	264	364	510	760	39,657	50,537	61,777	74,274	74,748
South West	19	33	55	76	92	24,582	32,218	40,681	49,758	51,000
Wales	*	14	23	29	47	16,905	20,789	24,631	28,662	28,957
Total	1,386	2,796	3,747	4,943	6,558	291,266	348,068	407,301	474,521	468,972

Note: cell counts marked * have been suppressed in order to protect confidentiality of individuals within the dataset
Source: ONS LS output

Table C.13 Summary of group LS members by age and census presence

Decade of birth	Overall	1971	1981	1991	2001	2011
Chinese						
1920s and earlier	199	58	89	157	119	62
1930s	241	76	133	176	162	135
1940s	387	107	215	283	274	269
1950s	676	56	233	439	434	480
1960s	813	64	174	392	377	539
1970s	1,093		219	338	525	787
1980s	1,586			260	464	1,367
1990s	533				204	502
2000s	276					276
Total	5,804	361	1,063	2,045	2,559	4,417
Jewish						
1920s and earlier	488	402	404	430	461	239
1930s	346	281	300	295	315	273
1940s	462	335	365	392	424	393
1950s	432	324	315	340	384	379
1960s	449	314	325	327	381	388
1970s	432		279	292	333	355
1980s	409			295	320	349
1990s	397				325	349
2000s	359					357
Total	3,774	1,656	1,988	2,371	2,943	3,082
Sikh						
1920s and earlier	277	93	118	130	217	151
1930s	525	277	340	351	420	376
1940s	769	364	528	534	619	666
1950s	1,307	332	855	989	1,075	1,174
1960s	1,131	320	463	642	844	1,019
1970s	1,146		490	529	678	1,039
1980s	1,015			572	616	946
1990s	655				474	618
2000s	569					569
Total	7,394	1,386	2,794	3,747	4,943	6,558
White British						
1920s and earlier	60,795	55,175	55,122	56,139	59,187	24,793
1930s	49,348	44,467	44,909	45,476	47,128	37,901
1940s	66,947	58,898	60,247	61,360	63,061	58,043
1950s	69,417	61,381	60,938	62,123	64,148	62,210
1960s	80,549	71,346	71,819	68,774	72,361	71,683
1970s	62,808		55,032	55,380	53,957	54,640
1980s	65,538			58,049	59,422	55,427
1990s	61,654				55,251	55,240
2000s	49,009					49,009
Total	566,065	291,267	348,067	407,301	474,515	468,946

(includes 61 Chinese, 189 Jews, 49 Sikhs, and 21,221 white Britons born in or before 1920)
Source: ONS LS output

Table C.14 Inter-super region migration patterns 2001-11 and 1971/81-2001/11

Group	Origin	Destination				Destination as percentage of flow from origin		
2001 – 2011		London	SE & E England	Rest of E & W	Total	London	SE & E England	Rest of E & W
Chinese	London	170	54	24	248	69%	22%	10%
	SE & E England	52	127	22	201	26%	63%	11%
	Rest of E & W	37	32	282	351	11%	9%	80%
	Total	259	213	328	800	32%	27%	41%
Jewish	London	451	112	35	598	75%	19%	6%
	SE & E England	37	128	23	188	20%	68%	12%
	Rest of E & W	39	15	229	283	14%	5%	81%
	Total	527	255	287	1069	49%	24%	27%
Sikh	London	304	103	42	449	68%	23%	9%
	SE & E England	26	202	40	268	10%	75%	15%
	Rest of E & W	40	39	814	893	4%	4%	91%
	Total	370	344	896	1610	23%	21%	56%
white	London	8898	5694	2153	16745	53%	34%	13%
British	SE & E England	2222	39851	6936	49009	5%	81%	14%
	Rest of E & W	1922	4365	99382	105669	2%	4%	94%
	Total	13042	49910	108471	171423	8%	29%	63%
1971/81 - 2001/11								
Chinese	London	196	61	18	275	71%	22%	7%
	SE & E England	45	120	23	188	24%	64%	12%
	Rest of E & W	64	36	259	359	18%	10%	72%
	Total	305	217	300	822	37%	26%	36%
Jewish	London	850	285	75	1210	70%	24%	6%
	SE & E England	53	125	20	198	27%	63%	10%
	Rest of E & W	71	32	354	457	16%	7%	77%
	Total	974	442	449	1865	52%	24%	24%
Sikh	London	547	102	73	722	76%	14%	10%
	SE & E England	36	303	49	388	9%	78%	13%
	Rest of E & W	83	81	1267	1431	6%	6%	89%
	Total	666	486	1389	2541	26%	19%	55%
white	London	17214	16518	6478	40210	43%	41%	16%
British	SE & E England	3397	60230	13469	77096	4%	78%	17%
	Rest of E & W	3292	11512	183485	198289	2%	6%	93%
	Total	23903	88260	203432	315595	8%	28%	64%

Source: ONS LS output

Appendix D Alternative approaches to measuring suburbanisation

Suburbanisation and counter-urbanisation have been discussed in the main text of the thesis in two places. Firstly, in Chapter 6, suburbanisation is discussed in a qualitative way through examination of the spatial distribution patterns found in the 2001 and 2011 censuses, with an emphasis on the London area. Secondly, counter-urbanisation has been addressed in Chapter 8, in terms of migration between rings centred on London over the 2010-11, 2001-11, and over a thirty year period. As noted in the latter chapter, the approach could not be extended to other locations as migratory flows are too small.

A general move of residential location from inner urban areas to outer urban areas (suburbanisation) and from urban areas in general to semi-rural and rural areas (counter-urbanisation) are two patterns of movement that may be found when internal migration and spatial distribution of groups are examined over periods of time (Boyle, Robinson, and Halfacree, 1998). As regards Anglo-Jewry, at the start of the twentieth century the majority of British Jews could be found in the east end of London (Endelman, 2002; Godley, 1996) but by the end of the twentieth century, the 2001 census demonstrates that the Jewish population of the City of London and Borough of Tower Hamlets (an area including but larger than the 'east end') was home to fewer than 1% of the total, with a major focus on suburban areas.

Suburbanisation and counter-urbanisation can be thought of as a pattern of internal migration, but the extent to which these elements have occurred may be more easily measured through comparing two snap-shots of spatial distribution taken at the start and end of the period of interest. When considering small population groups such as Anglo-Jewry, using measures that are derived from the whole of the population (rather than just the element of that population that has actually moved residence) may extend the area over which measurements of suburbanisation can be made – in this particular case allowing locations other than the London area to be considered. Of course, some of the changes measured by looking at the population as a whole do not arise solely from patterns of internal migration – international migration directly to the suburbs, or a different age profile between those living in inner and outer areas (resulting in differential patterns of births and deaths) will also impact on the situation. However it can be argued that these mechanisms are valid elements of suburbanisation and counter-urbanisation. As regards Anglo-Jewry, the

group under investigation in this appendix, international migration is likely to be only a small contributor to change in patterns (see Chapter 9), but the geodemographic assessments discussed in Chapter 5 and particularly Chapter 9 do highlight different impacts of births and deaths in different areas.

In this appendix, data from the 2001 and 2011 censuses have been compared in two ways to shed an extended light on recent Anglo-Jewish suburbanisation and counter-urbanisation. Firstly, making use of the geodemographic assessment analysis groups (see Chapter 9) those with the greatest population loss between 2001 and 2011, and those with the highest growth were identified. Figure D.1 highlights the groups in the London area falling outside the England and Wales growth inter-quartile range (shrinkage of at least 15%, or growth of 20% or more). The majority of contracting areas fall within the Greater London boundary, with expanding areas in Hertfordshire and Essex (outside of Greater London) or in Barnet and Hackney. Most other Jewish accumulations consist of too few analysis groups for a meaningful picture to arise; however, in Greater Manchester (34 groups) a collection of 8 expanding groups (in the Broughton Park orthodox area) are adjacent to three shrinking groups, and in Leeds (11 groups) a core of five shrinking groups sits at the centre, with the surrounding six groups all falling within the inter-quartile range.

The second approach was to assess (for each accumulation – see Chapter 5) whether the average distance of the Jewish population from the relevant urban or conurbation centre had increased or reduced over the 2001 to 2011 period. For this assessment individual MSOA data (rather than grouped data) or LSOA data were used. The ONS population weighted centroid file was used to locate each area; in addition a town centre point was also located (and for convenience a town centre LSOA centroid was used for this). The distance of each MSOA/LSOA in the accumulation from its central point was calculated, and a population-weighted average distance calculated, for 2001 and 2011. Some accumulations were too small for a meaningful calculation to be carried out. Table D.1 summarises the results for accumulations/communities with at least 400 Jewish residents. (The table uses population excluding students so that any changes in university popularity do not distort the picture).

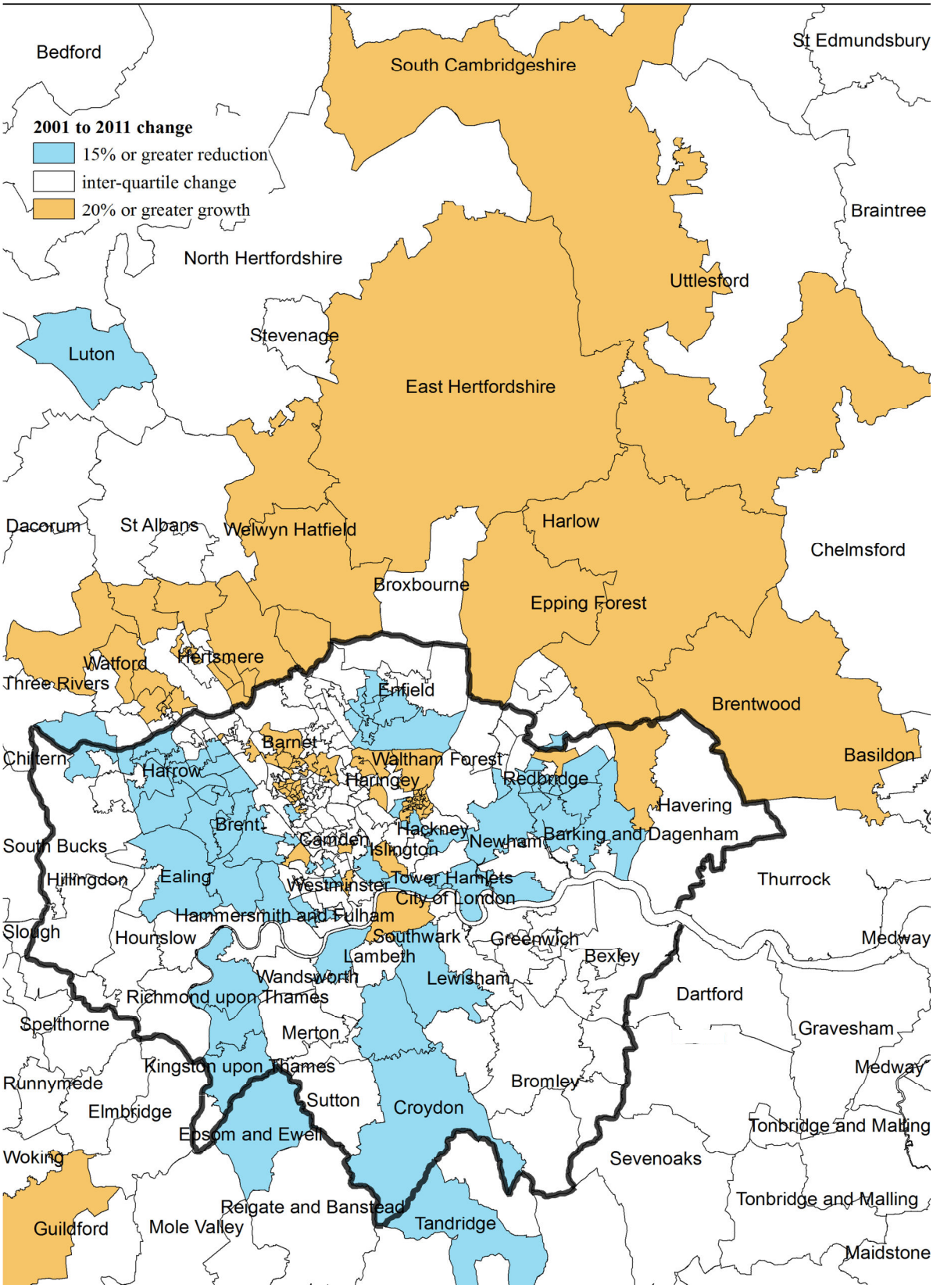


Figure D.1 2001 to 2011 London area analysis group population change

Table D.1 Mean distance of Jewish population from urban centre 2001 and 2011

Accumulation	2001 Jewish Residents (exc students)	2011 Jewish Residents (exc students)	Mean Distance from Centre 2001 (km)	Mean Distance from Centre 2011 (km)	Absolute Change 2001 to 2011 (km)	Percentage Distance Change 2001 to 2011
Newcastle	789	564	4.33	4.30	-0.03	-1%
Gateshead	1157	1947	1.16	1.48	0.32	28%
Leeds	7187	6047	7.57	7.78	0.22	3%
Hull	444	227	6.48	7.27	0.79	12%
Sheffield	500	401	4.17	4.18	0.01	0%
Gtr Manchester Total	19632	22684	7.52	7.07	-0.46	-6%
Liverpool	2327	1777	6.71	6.63	-0.07	-1%
Southport	557	343	2.21	2.50	0.29	13%
Blackpool & St Annes	715	549	4.82	5.09	0.27	6%
Birmingham & Solihull	1617	1160	5.64	5.88	0.24	4%
Nottingham	720	635	4.03	4.39	0.36	9%
Southend	3147	2585	3.74	3.98	0.24	6%
Cambridge	751	763	3.05	3.49	0.44	14%
Luton	509	312	2.58	2.63	0.05	2%
Oxford	781	779	3.23	2.90	-0.33	-10%
Brighton	3677	3120	4.62	4.98	0.35	8%
London Area Total	167346	171129	13.88	13.76	-0.12	-1%
Bournemouth	2200	1902	3.74	4.48	0.74	20%
Bristol	439	397	2.55	2.47	-0.09	-3%
Cardiff	752	638	4.22	4.36	0.13	3%

Of the 15 accumulations listed where the average distance has changed by more than 0.1km, only one (excluding the London area and Greater Manchester area considered below) shows a reduction in distance. The pattern in the London area is too varied to reduce down to a single figure. Indeed, the pattern in London is likely to vary considerably depending on which direction from the centre is being considered, so a more detailed breakdown for the London area was prepared. However, rather than breaking down the area into, say, 24 fifteen degree sectors, given the very uneven Jewish population distribution in the London area, the area was broken down into sectors defined to give an equal Jewish population in each. A central point near Charing Cross was chosen, and a datum radius set just south of east to split areas north of the Thames from those to the south. Working clockwise from this datum, 24 sectors each with just over 7000 Jewish residents were formed.

More straightforwardly, taking account of the strong north-south axis of the Greater Manchester accumulation, that area was split in Manchester city centre,

between areas to the north and those to the south to see if there was a difference in pattern there. Table D.2 summarises the results for the subdivisions. In Greater Manchester, the mean distance to the Jewish population in the south has slightly increased over the intercensal period; to the north it has reduced – primarily as a result of the large growth in the Broughton Park (orthodox enclave) area, which is closer to the city centre than other (mainstream) areas to the north.

For the London area, only six of the 17 sectors in which the distance changes of more than 0.1km show a reduction in distance. However the pattern is clearly complicated and is more simply understood by reference to Figure D.1.

Virtually all the shrinking areas are urban/suburban localities within the Greater London boundary (East London, Redbridge, and Barking, shrinkage 6000; Harrow, Brent, and Ealing, shrinkage 5000; Enfield, 700; South London, 600; SW London 400). Apart from a few isolated groups, the expanding areas are found either in a large 'Home Counties' areas covering south and east Hertfordshire and west Essex (expansion 4000), or the Mill Hill / Finchley area (2000), and orthodox Golders Green (3000), and Stamford Hill (6000) areas of north London.

Overall, the conclusions on the patterns found by these approaches for the 2001-11 period are that:

- the largely edge-of-inner-urban strictly orthodox areas are expanding, but (as discussed in Chapter 9) this is largely self-generating due to high fertility, rather than due to migration from other parts of England and Wales (urban intensification).
- in London, there is a measurable loss of population in urban and suburban areas within the Greater London boundary, and a measurable increase in locations beyond the boundary (counter-urbanisation). There are, however, some gains in the Mill Hill / Finchley area (suburbanisation).
- Elsewhere, most provincial communities have seen an increase in their centre of gravity away from the urban centre. In two cases (Bournemouth and Hull) the mean distance has increased by over 0.7km. There is thus a degree of ongoing suburbanisation in provincial centres too, though some of this may be by 'stealth' – uneven spatial distribution of births and deaths rather than simply/solely physical moves to locations more distant from the urban centre.

Table D.2 Mean distance of London and Manchester Jewish population from urban centre

Sector	Sector limits (clockwise from east Thames) degrees	Approximate direction	Mean Distance from Centre 2001 (km)	Mean Distance from Centre 2011 (km)	Absolute Change 2001 to 2011 (km)	Percentage Change 2001 to 2011
	London Area					
A	0 to 106	SE and South	11.88	11.72	-0.16	-1%
B	106 to 142	SW	14.30	14.39	0.09	1%
C	142 to 180	West	19.09	19.06	-0.03	0%
D	180 to 194	West by North	14.85	14.75	-0.10	-1%
E	194 to 201	WNW	14.84	14.92	0.08	1%
F	201 to 208	NW by West	14.68	14.79	0.12	1%
G	208 to 210	NW by W / NW	16.52	16.84	0.33	2%
H	210 to 215	NW	14.36	14.89	0.52	4%
I	215 to 217	NW	13.35	12.93	-0.42	-3%
J	217 to 219	NW	12.98	12.77	-0.21	-2%
K	219 to 220	NW	13.26	13.47	0.21	2%
L	220 to 222	NW / NW by N	12.52	12.65	0.13	1%
M	222 to 224	NW by North	14.05	14.04	0.00	0%
N	224 to 227	NW by North	12.08	12.86	0.78	6%
O	227 to 231	NW by North	12.06	12.78	0.72	6%
P	231 to 238	NNW	12.44	12.47	0.02	0%
Q	238 to 245	NNW	12.48	12.41	-0.07	-1%
R	245 to 256	North by West	13.83	14.61	0.78	6%
S	256 to 280	North	12.87	13.57	0.70	5%
T	280 to 285	NNE	9.50	9.15	-0.36	-4%
U	285 to 293	NE by North	9.46	8.96	-0.49	-5%
V	293 to 306	NE by N / NE	15.02	15.09	0.07	0%
W	306 to 315	NE / NE by E	14.98	15.28	0.30	2%
X	315 to 360	ENE and East	15.37	16.31	0.93	6%
	Greater Manchester					
Y	Manchester North, Salford, Bury		6.39	6.00	-0.39	-6%
Z	M'cr South, Trafford, Stockport, Cheshire E		10.70	10.81	0.11	1%

The analysis presented in this appendix demonstrates that assessing concepts such as suburbanisation can be achieved beyond the London area for at least one small population group, and for Anglo-Jewry has identified a mix of patterns – urban intensification in the strictly orthodox communities; counter-urbanisation into the Hertfordshire and Essex hinterland; and a level of ongoing suburbanisation in north London and most provincial communities.